



British Birds

March 2016 • Vol.109 • 135–190

NATURAL HISTORY
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Gibraltar • Isabelline Shrikes

Conservation research news

Lead poisoning • Best Bird Book 2015



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Front-cover photograph: Male Marsh Harrier *Circus aeruginosus*, Hungary, May 2013. This is one of several Annex 1 species whose populations have increased in the UK, adding to the evidence for the importance of the Nature Directives in Europe (see p. 171). *Ian Butler*

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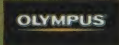
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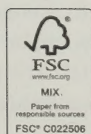
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The reappearance of Conservation research news in this issue is welcome, after an unscheduled two-year absence. The topics of recent research featured in this latest bulletin from the RSPB Centre for Conservation Science include some familiar topics: struggling seabird populations and continuing research on our dwindling population of Turtle Doves. The remaining item, on the importance of the Nature Directives, is something that has come to the fore more recently, but the evidence put together on the effectiveness of the EU's oldest piece of nature legislation is a fascinating piece of work (p. 171). It was good to see that, a few days before I sat down to write this editorial, Europe's political representatives voted overwhelmingly in favour of that legislation.

Elsewhere in this issue, you can look out for a portrait of one of the most accessible of UK Overseas Territories to feature in our series, some identification minutiae in the form of the Isabelline Shrike complex, the latest Best Bird Book of the Year award and an article about the continuing problems of lead poisoning. In the same way that EU legislation might not seem to be the most gripping subject, lead poisoning might not intuitively be near the top of your list of things to worry about. But the evidence shows pretty clearly that it is far from trivial; I learnt a lot from Ian Newton's summary of the issues (see pp. 172–179) and I suspect I won't be the only reader to do so. The use of lead in paints, petrol and pencils belongs in a bygone age – how is it that we are being so slow to get rid of it in ammunition for game hunting?

Roger Riddington



British Birds aims to: ❖ provide an up-to-date magazine for everyone interested in the birds of the Western Palearctic; ❖ publish a range of material on behaviour, conservation, distribution, ecology, identification, movements, status and taxonomy as well as the latest ornithological news and book reviews; ❖ maintain its position as the journal of record; and ❖ interpret scientific research on birds in an easily accessible way.

No Way But Gentleness

No Way But Gentleness – a memoir of how *Kes*, my Kestrel, changed my life is published this month by Bloomsbury. I should declare an interest at the outset, in that I am willing this book to do well. That's why this has evolved from a conventional review to a guest opinion piece.

I was lucky enough to befriend the author, Richard Hines, at the first of the New Networks for Nature conferences, on a freezing, foggy December day in Oxford, back in 2009. It slowly dawned on me that Richard was once the boy whose early experiences with a Common Kestrel *Falco tinnunculus* inspired the character Billy Casper in the 1968 novel and later the film *Kes*. Even if Richard isn't Billy (he has, on occasion, had to live down 'the Billy thing'), the Kestrel he had trained was very definitely *Kes*.

I admit to being more than a little bit star-struck in that moment. Richard is a modest, truth-seeking and plain-speaking man, but one for me who – even without fully realising it – occupies a significant place in our cultural history, and certainly in the context of UK birdlore. As I have got to know him better, and we have corresponded regularly, we have shared many thoughts and experiences around the subject of our inspirations in nature, and the particular importance of birds of prey.

Richard has been generous enough to walk me round the focal points of his and *Kes*'s story. He has shown me locations used for the film, some of which are places important in his childhood, which he spent in and around the mining village of Hoyland Common, near Barnsley. Central to this is Tankersley Old Hall, where nesting Kestrels were the source of the young fledgling he trained, and from which older brother Barry took the inspiration for his novel *A Kestrel for a Knave*.

Some people think it's our best film, and *Kes* also is arguably the most famous British bird of all time. The 1969 film of the novel quickly became a cult, and was broadcast regularly on television. I have no doubt about its

impact on me, watching it as a child with my family. It was the talk of our school the next day, and for many days after. It's intriguing that a film some people consider the best Britain has ever produced, and which a British Film Institute poll ranked number 7, is a film centred around and named after a bird.

The enduring importance of *Kes* in the cultural history of Britain was further underlined when footage from the film was projected to the world during the London Olympics opening ceremony. There they were, the put-upon boy and his bird, his little piece of freedom – *our* little piece of freedom – of wildness, lived through a small falcon.

He may be a character from fiction, but Billy Casper feels a bit like a kid we all knew at school, as well as being one most of us actually did know – since Billy's face (that of the untrained actor David 'Dai' Bradley) was printed on the cover of a text often set for students on English literature courses. The image of Billy (and, by extension, his falcon) holding two fingers up to uncaring authority is iconic. I love Richard Hines's account of how mortified his mother was when this image of defiance appeared on a billboard in their village, advertising the release of the film.

Like Richard I'm interested in the importance of birds to people, and fascinated by the particular significance of birds of prey. I think *Kes* has played a huge role in creating this place for birds and birds of prey in our lives, our culture, and our sense of selves, of justice, of connection to natural environment made difficult and sometimes impossible for some. Unless you have been a coal miner yourself, it is probably impossible to imagine the value you might have placed on the wild nature above the ground surrounding a pit village. Richard's father and grandfather were miners. He brings them to life in this book, with great affection.

Conscious that my own interest in birds may bias me, I asked film-maker and cinema historian Mark Cousins why *Kes* is so important in the context of the British film industry. '*Kes* had great impact for a number

of reasons,' he says. 'As British cinema grew out of theatre, it tended to stiffness and declamatory-ness. Unlike movies from some other countries, it was suspicious of the "natural". Centring a film on a bird parachuted naturalism into the centre of British cinema.'

No Way But Gentleness pulls no punches on the issues of class and entitlement – or lack of – that also made *Kes* so groundbreaking. Cousins again: 'If working class people appeared in British films, they were usually heart of gold, salt of the earth clichés. Marionettes of sorts. *Kes* started from a different social position, a more grounded one.'

In his book, Richard Hines provides new insights on the making of the film, and his own role in the training of the Kestrels used, and of lead actor David 'Dai' Bradley. *Kes* reflected the radical new social realist techniques that the writing of northern, working-class authors brought to literature, and the documentary techniques, influenced by Czech cinema, that director Ken Loach brought to the film. A number of non-actors were employed, including Bradley, and characters allowed to improvise dialogue.

I think *Kes* carries on a tradition established by the women who campaigned for birds through the late nineteenth and first quarter of the twentieth century, and is manifest today through bird conservation generally and the focus on raptor persecution in particular. Consciously or not, through our efforts for birds we are seeking a better way of things generally, a kinder way of managing nature, and ourselves.

The book's title comes from Edmund Burke's 1619 *Treatise on Hawks and Hawking*. There is, in the end, 'no way but gentleness to redeeme a Hawke', and the same is true for school 'write-offs' like Billy, and Richard. As he describes so evocatively in the book, he too was earmarked in early life and by an inflexible education system to a lesser lot in life. *No Way But Gentleness* is about what happened next.

Author and astringer T. H. White learnt the hard way the truth about this need for gentleness, as described in *The Goshawk* (1951). I have seen for myself how significant

the cottage to which White retreated, to tame his hawk and write the book, is to Richard. It felt like a site of pilgrimage when we walked there one bright morning in early spring. He explains this fully in his book.

So, as I say, I have to declare an interest. The autobiography is now published, and I am delighted to see it, as well as having greatly enjoyed this forthright and moving story in its final form. There aren't many British birds that earn individual fame. *Kes* is a particular exception, and in a league of its own. As Richard makes clear, falconry, practised well, is an art requiring great skill, patience, commitment and attention to detail. The lives of most Kestrels in the care of schoolboys would be short and ignominious. Today, with developments in captive breeding, there is thankfully no need for Kestrels to be taken illegally from the wild.

Birds of prey don't, in the end, make affectionate or demonstrative charges, but pets do provide close relationships that work in drama. Billy loved his Kestrel, in a way that would have been impossible to convey through binoculars. Falconer or just plain old bird enthusiast, if you can love something that isn't giving very much love in return, perhaps that is the greatest love, and is part of the particular resonance of *Kes*, and totemic power of birds generally.

And if you can set a bird free, as Richard did for the Kestrels immortalised on film, well, even better. Letting go might even be the greatest gentleness.

Conor Jameson



63. Billy and his Kestrel, from the film *Kes*.

Conor Jameson is an author, conservationist and a Director of *British Birds*.

News and comment

Compiled by Adrian Pitches

Opinions expressed in this feature are not necessarily those of *British Birds*

Martin Garner

Inspirational identification enthusiast (and recent member of BBRC) Martin Garner lost his battle with cancer on 29th January. *BB* Editor Roger Riddington remembers a shining talent:

'Martin was an inspiration to everyone who knew him. Like most *BB* readers, I first came across his name as the author of a groundbreaking and authoritative paper on the identification of 'Yellow-legged Gulls' (a name which covered both *Larus michahellis* and *L. cachinnans*, back in those days), published in *BB* in early 1997 (<http://bit.ly/20m4rl7>). When he died, he was still working on gulls, for the latest instalment in his 'Challenge' series of books. In between had come so much more, the more obscure, the more challenging the better. He set up the Birding Frontiers website, which connected him with birders around the world – you can read one of his last posts, on gulls with Chris Gibbins, at <http://bit.ly/1T3wi9b>. It's classic Garner: it starts with a 'BOOM!', it proceeds in a blizzard of vibrant colour and it succeeds in telling the story in a way that you can understand and remember. Communication was perhaps Martin's greatest skill.

'I first met the man in the flesh about ten years

ago, on a freezing day in northwest England, at a BBRC meeting. He served for several years on BBRC, contributing hugely, until last year. He first came to Shetland in September 2009, and after that first visit usually stayed with us at the start and end of his tour-leading commitments. He filled the house with his enthusiasm – for birds and for life – just as he infected those who met him. In September 2013, he arrived off the plane complaining of a bad back, and was barely able to lift his suitcase. We sent him to bed with a cocktail of painkillers and a couple of drams; little did we realise that it was the first outward sign of something much more serious. Last September, we welcomed Martin and Sharon for the last time in Shetland, when it was a privilege to spend time with both of them and be in the field with him for the last time.'

Martin was always on the hunt for overlooked races of familiar species. He would have loved his friend Anthony McGeehan's investigation of 'Hebridean' Song Thrush, which you can read here: www.britishbirds.co.uk/article/fifty-shades-of-brown

New species of Himalayan thrush

A new species of *Zoothera* thrush has been described in northeast India and adjacent parts of China by a team of scientists led by Per Alström. The bird has been named the Himalayan Forest Thrush *Zoothera salimalii*, in tribute to the great Indian ornithologist Sâlim Ali (1896–1987). It's only the fourth new bird species described in India since the country gained independence, in 1947.

The Himalayan Forest Thrush was first discovered when it was realised that what had been considered a single species, the Plain-backed Thrush *Z. mollissima*, was in fact two different species. What first caught the attention of Per Alström was the fact that the 'Plain-backed Thrushes' in the coniferous and mixed forest had a rather musical song. This was in contrast to individuals found on bare rocky ground above the tree line in the same area, which had a much harsher, scratchier, less musical song.

Studies of museum specimens in several countries revealed consistent differences in plumage and structure between birds that could be assigned

to either of these two species. It was confirmed that the species breeding in the forests of the eastern Himalayas had no name. It was suggested that the high-elevation Plain-backed Thrush be called the 'Alpine Thrush' instead, while retaining the scientific name of the 'original' species, *Z. mollissima*, in accordance with international nomenclatural rules.

Further analyses of plumage, structure, song, DNA and ecology from throughout the range of 'Plain-backed Thrush' revealed that a third species is present in central China. This was already known, but treated as a subspecies of 'Plain-backed Thrush'. It's now been named Sichuan Forest Thrush *Z. griseiceps*. DNA analysis suggests that these three species have been genetically distinct for several million years. And genetic data from three old museum specimens indicate the presence of potentially a fourth, as yet unnamed, *Zoothera* species in China. Future studies are required to confirm this.

Beijing bunting bonanza

In the past decade British birders have been blessed with a steady stream of Asian buntings from farther and farther east (most recently the Chestnut Bunting *Emberiza rutila* on Papa Westray, Orkney, in October 2015) but one Oriental bunting that's highly unlikely to occur in the Western Palearctic is Jankowski's Bunting *E. jankowskii*, which breeds in Inner Mongolia, China.

However, birders in Beijing have been treated to an unprecedented wintering flock of these delightful birds, the first records in Beijing municipality for 75 years. A single bird was discovered at Miyun Reservoir, 80 km northeast of central Beijing, by young local birders Xing Chao and Huang Mujiao on 9th January. See www.birdingbeijing.com/2016/01/17/jankowskis-bunting-in-beijing By 13th January, seven birds had been found, and on 15th a remarkable nine individuals of this globally endangered species were present. (The municipality's previous record was of two males collected near the Summer Palace in the winter of 1941.)

Jankowski's Bunting was named after Michel Jankowski, a nineteenth-century Polish zoologist exiled to Siberia. It has declined drastically since the early 1970s, probably as a result of the conversion of its grassland habitats to arable farmland and an increase in grazing livestock. This beautiful bunting is now known only from a restricted area of northeast China; the species formerly occurred in the far northeast of North Korea (its current status there is unknown) and the extreme south of the Russian Far East (there have been no Russian records since the 1970s).

Terry Townshend, a British birder based in Beijing and who writes the *Birding Beijing* blog, is the BirdLife Species Champion for Jankowski's Bunting. He said: 'Given the relatively low density of birders in Beijing, it is possible that Jankowski's Bunting has been overlooked in previous winters. However, I suspect that this winter is exceptional. Last year the government banned the

growing of crops close to the reservoir, which provides drinking water for Beijing, so the area around the wetland has been left uncultivated. Grasses and other wild plants have produced a bumper crop of seed that is attracting large numbers of passerines – including a Beijing record flock of 5,600 Lapland Buntings *Calcarius lapponicus* at the end of November.'

The Hong Kong Birdwatching Society/BirdLife China Programme and China Bird Watching Society have been taking action for Jankowski's Bunting on its breeding grounds in Inner Mongolia for several years; surveys in 2014 discovered nine new breeding sites for the species. In addition, meetings have been held with the local authorities and a number of educational activities have been carried out at schools and villages close to its core breeding areas, to raise awareness of the bunting and its conservation.

Mike Crosby, BirdLife's Senior Conservation Officer for the Asia Division, commented: 'The discovery of a small flock of Jankowski's Buntings close to Beijing is encouraging news for this little-known species, and perhaps indicates that at least part of the species' population moves several hundred kilometres south from its breeding range during the winter. Improving our understanding of the wintering range is vital for our ongoing efforts to conserve this globally threatened songbird.'



Terry Townshend

64. Jankowski's Bunting *Emberiza jankowskii*, Beijing, China, January 2016.

RSPB acquires northernmost point of mainland Britain

RSPB Scotland has announced the purchase of Dunnet Head, the northernmost point of mainland Britain, after receiving a grant from the Heritage Lottery Fund. The coastal headland in Caithness with its 100-m-high cliffs is home to thousands of breeding seabirds including Puffins *Fratercula arctica*, Razorbills *Alca torda* and Kittiwakes *Rissa tridactyla*. The RSPB has leased the 16-ha site since May 2008, but has now come to an agreement with the owner to buy the reserve. Dunnet Head lies around 20 km east of Thurso

and looks across the Pentland Firth towards Orkney.

RSPB Scotland site manager Dave Jones said: 'Dunnet Head really is an amazing place. The views across to Orkney are absolutely stunning, but for us, the most important aspect is the breeding seabirds and the opportunity this site gives visitors to see these charismatic birds. Many of our seabird species are in serious decline so it is crucial that their breeding sites are properly protected.'

Polish Mute Swans

The so-called 'Polish' Mute Swan *Cygnus olor* is a genetically determined colour variant, which results in white cygnets with pale greyish-pink legs and feet. In over 50 years of birding in Norfolk, Moss Taylor has encountered Polish Mute Swans at only two locations: Cley and Felbrigg, and is interested to know more about their distribution – are they really that unusual? Following an article in *Birdwatch* in May 2015, further reports were received from southeast England (in Kent, Essex, Suffolk and Norfolk), and since 2013 Polish Mute Swan cygnets have been reported from seven localities within these four counties. But is this really a

true reflection of their distribution?

A national survey of Polish Mute Swans has never been attempted and Moss is keen to research this further, and to receive any reports of this colour phase in cygnets seen in 2016, as well as any adults (preferably sexed) that show the characteristic greyish-pink legs and feet, compared with the normal black. Any additional historical records would also be valuable. Please send all sightings and reports by e-mail to moss.taylor@btinternet.com or by post to Moss Taylor, 4 Heath Road, Sheringham, Norfolk NR26 8JH.

No EU ban on lead ammunition for hunting

Birds in Europe will continue to be put at risk from lead poisoning, as the European Commission has announced that it will continue to allow the use of lead in ammunition. Lead ammunition use will be regulated on a limited basis under the EU chemicals regulation REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals), despite it being responsible for thousands of bird deaths every year. See the article by Ian Newton on pp. 172–179 of this issue, which explores the subject further.

Under REACH, the use of lead in ammunition could be banned completely through a so-called 'restriction process'. Sadly the Commission has chosen to focus only on lead in wetlands, where a ban is already supposed to have been in place for many years. By taking this course, the Commission is ignoring the evidence of damage done by lead shot in other habitats and by rifle ammunition.

Lead is highly toxic to birds and people alike. Ducks and waders often mistake fragments of lead shot for grit and die a slow and painful death from the toxic effects. Throughout the EU there are also frequently major cases of lead poisoning of

raptors. One notable example is the poisoning of White-tailed Eagles *Haliaeetus albicilla*, which eat carcasses containing lead bullets every autumn.

The UN Convention on Migratory Species, which the EU has signed, has called on its signatories to phase out all lead ammunition within three years. Some EU Member States, notably Denmark, have already done so. Partial bans have been proven to be ineffective and unenforceable. In the UK, for example, lead shot has been banned in wetlands only, but investigations showed that as many as 70% of the ducks shot in England still contained lead shot.

Reacting to the Commission's announcement, Ariel Brunner, Head of Policy at BirdLife Europe and Central Asia, told us: 'The case for a complete ban of lead ammunition in the EU is crystal clear. The Commission should protect its wildlife and citizens from poisoning and meet its obligations under the Convention on Migratory Species... Alternatives to lead ammunition, such as steel shot and modified bullets, are readily available and there is no reason to delay banning lead in ammunition.'

Taking the lead

There are currently two petitions on the UK Parliament website on the subject of lead in ammunition: the one that is in favour of maintaining lead ammunition <https://petition.parliament.uk/petitions/112165> is driven largely by the two main hunting organisations and currently has more than 23,000 signatures. And the one calling for a

ban <https://petition.parliament.uk/petitions/111533> (started by Rob Sheldon, formerly at RSPB) currently has over 11,000 signatures. Readers who feel strongly about this issue might like to consider adding their signature to whichever petition best reflects their own thinking.

MEPs vote for nature conservation

There was some happier news from the European Parliament where MEPs voted by a huge margin NOT to water down the key Birds and Habitats

Directives that have protected nature in Europe for more than 35 years. Read more on this at <http://bit.ly/1R9uo6Z>

Champions of the Flyway

The third *Champions of the Flyway* bird race (which takes place in Israel at the end of this month) is once again fundraising to tackle the illegal killing of birds around the Mediterranean. This year's project will support the Hellenic Ornithological Society (HOS) in Greece where an estimated one million migratory birds are illegally killed every year.

The problem is widespread throughout the Greek islands – and on the mainland. Funds raised by this year's *Champions of the Flyway* www.champions-of-the-flyway.com bird race will target the illegal shooting and trapping of Turtle Doves *Streptopelia turtur* and other migrants passing through the tourist islands of Santorini and Zakynthos.

The HOS will also use *Flyway* funding to tackle the illegal trapping of songbirds for the cage-bird market. Wild birds are regularly sold online and in markets all over Greece, including the famous 'underground' market in Athens – and even openly in pet shops. As part of the conservation action HOS will target the poachers on the ground but also aim to work with the City of Athens to



ANIMA

65. A cage of Goldfinches *Carduelis carduelis* at Schisto Market, Greece.

stop the illegal trade.

This year there will again be a BBRC team in Israel, flying the flag for *British Birds*, and carrying the Zeiss logo to acknowledge their main sponsor. If you wish to support the BBRC team, you can use this link: <http://www.champions-of-the-flyway.com/the-bbrc-vagrants/>

Breeding Peregrines watch Rugby World Cup

A pair of Peregrine Falcons *Falco peregrinus* has bred successfully inside Stadium MK (the home of Championship football team MK Dons) and in doing so witnessed several games during the 2015 Rugby World Cup! This is the first known breeding of Peregrines in Milton Keynes – and it is believed to be the first time that urban Peregrines

in the UK have nested inside a sports stadium. The pair, which used an old crow's nest, successfully fledged one chick and all three remained unfazed by more than 30,000 cheering fans around them.

(Contributed by Mike Wallen)

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Important Bird Areas

Gibraltar

Keith Bensusan and Charles Perez

<https://theresagreen2.wordpress.com>



66. An aerial view of Gibraltar, looking north over mainland Spain, December 2010.

Abstract Gibraltar is a tiny, rocky promontory at the southern tip of the Iberian Peninsula. It is a UK Overseas Territory, captured from Spain by an Anglo-Dutch force in 1704 and ceded to Britain in 1713. Situated on the northern shore of the Strait of Gibraltar, little more than 20 km from the North African mainland, it is an important bottleneck site for the migration of large soaring birds, and is also important for migrant seabirds entering and leaving the Mediterranean. The site's habitats and natural history interests are described with particular reference to its IBA designations.

Introduction

Gibraltar is a UK Overseas Territory, located at the southern tip of Iberia and bordering mainland Spain. The Rock of Gibraltar sits at the eastern end of the north shore of the Strait of Gibraltar (c. 36°07'N 5°20'W), which marks the entrance to the Mediterranean from the Atlantic. The territory comprises an area of 6.5 km², being some 5 km long and about 2 km at its widest point. A large proportion of the territory is urbanised, and mainly at or near sea level, with a population of around 30,000 inhabitants. The southern tip of Gibraltar is just 21 km from North Africa, with the Spanish autonomous

city of Ceuta lying directly to the south.

The Rock of Gibraltar is a monolithic promontory that consists mainly of Jurassic limestone. It rises abruptly from sea level to 426 m and forms part of a geological region known as the Gibraltar Arc, which includes the Baetic Mountains of Spain and the Rif Mountains of northern Morocco. The western side of the Rock slopes steeply, is densely vegetated and includes some smaller cliffs. The northern and eastern sides consist of precipitous and impressive cliffs, the most notable of which is the northern face, looking across to Spain. These cliffs span the entire elevation of the Rock and are home to

important birds and plants. On the eastern side, a combination of talus and wind-blown sands has created large, sandy slopes, which include the Great Gibraltar Sand Dune, of Pleistocene origin and rising from sea level to about 300 m. Most of this was covered in corrugated iron sheeting in the late nineteenth century to serve as a water catchment, but the sheets were removed and its vegetation restored in the 1990s, thanks to work carried out by the Gibraltar Botanic Gardens and the Gibraltar Ornithological & Natural History Society (GONHS). The southern end of the Rock consists of a series of wave-cut platforms that form the only flat land on the Rock itself. This includes the areas of Europa Point and Windmill Hill Flats, the latter being largely controlled by the UK Ministry of Defence and of exceptional importance to wildlife in Gibraltar, especially for migrating songbirds and breeding Barbary Partridges *Alectoris barbara*. The sandy isthmus that connects Gibraltar and Spain is also flat, but is now largely built over.

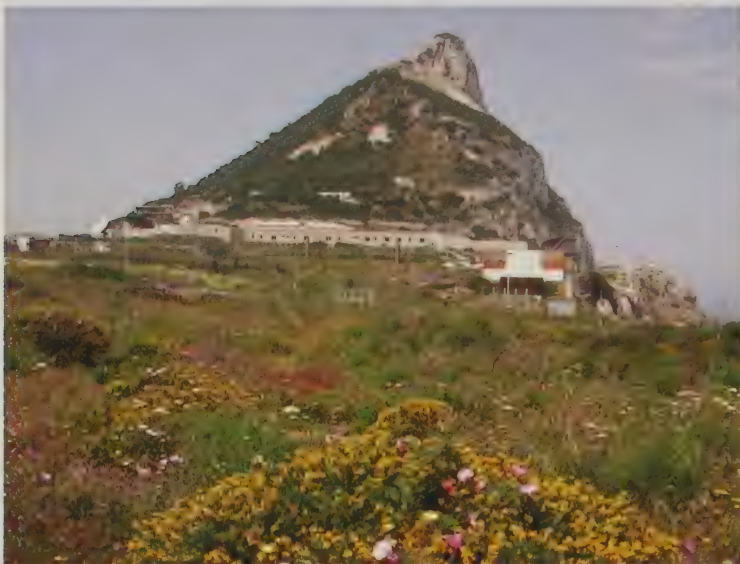
Gibraltar's coastline of 12 km is completely surrounded by water, except for its land border with Spain to the north. The waters around Gibraltar are under the Rock's jurisdiction as British Gibraltar Territorial Waters. On the western side, the waters of Gibraltar end along a median line down the Bay of Gibraltar, alongside Spanish waters. On the southern and eastern sides, the territorial waters extend for three nautical miles, and the area of Gibraltar's territorial waters is 87.4 km². The coastline itself consists of rocky shore, beaches and developed areas, while there are extensive, rocky reefs within Gibraltar's waters. Estuarine and freshwater habitats are completely lacking in Gibraltar and this is reflected in its avifauna.

The climate in Gibraltar is typically Mediterranean, with warm, dry summers and mild, wet winters. However, the proximity of the sea means that Gibraltar is often cooler during the summer and milder during the winter than other parts of southern Iberia and northern Morocco. The average annual temperature is 18°C (21°C during the

day and 15°C at night); January is the coldest month, with a mean temperature of 13°C, whilst August is the warmest, mean 24°C. Average annual rainfall is just under 800 mm, but the summer is extremely dry, with virtually no rainfall during June, July and August. Prevailing winds are along an east–west axis and this has a huge influence on migrating birds. Atmospheric humidity can be high, especially during 'Levanter' conditions with easterly winds, when humid air is blown against the eastern cliffs from the Mediterranean where it condenses and forms a dense cloud that shrouds the Rock, even during the summer months.



Fig. 1. Map of Gibraltar with location of birding sites and key areas marked (see p. 155). Birding sites around Gibraltar: (1) Jews' Gate bird observatory; (2) Cable Car top station; (3) Europa Point; (4) Windmill Hill Flats; (5) North Front Cemetery; (6) Upper Rock; (7) North Face; (8) Gorham's Cave complex; (9) north talus slope; (10) south talus slope.



67. A wide variety of habitats occur on Gibraltar. This view from Windmill Hill Flats in the Gibraltar Nature Reserve, in August 2015, shows the mosaic of garrigue, maquis and cliff that characterises the southern end of the Rock.

The economy in Gibraltar has diversified considerably since the 1980s, until which point it relied principally on the UK Ministry of Defence (MOD). The MOD now has a very small presence on the Rock, generating around 6% of GDP. The economy is now dominated by the financial sector (which generates around 30% of the remaining GDP), tourism (30%) and shipping services (25%, including refuelling), with telecommunications, e-commerce and e-gaming accounting for another 15%. Gibraltar offers a favourable tax system for the financial sector, including a Corporation Tax of 10%. The financial sector of Gibraltar is recognised as well regulated by the International Monetary Fund (IMF). Owing to the attractiveness of its tax system and corporate confidence in the quality and robustness of its financial sector, economic growth in Gibraltar has remained extremely healthy even during the recent financial crisis. GDP per capita was estimated at £47,066 for 2014.

Habitats

For such a small area, Gibraltar has a wide variety of habitats. The vegetation on the western slopes of the Rock was denuded for use as fuel during the eighteenth century following the arrival of the British. It is likely

that the species assemblage of trees was originally quite different from the present composition, which consists mainly of fruit-bearing shrubs that colonised the slopes in bird droppings. These form a tall, thick and impenetrable scrub or maquis that covers much of the Rock. The most common shrub is the Wild Olive *Olea europaea*, which often forms a tree. Other common species are the Osyris *Osyris lanceolata*, Mediterranean Buckthorn *Rhamnus*

alaternus, Lentisc *Pistacia lentiscus* and Terebinth *Pistacia terebinthus*. Dwarf Fan Palm *Chamaerops humilis* – the only palm native to mainland Europe – is common especially in rocky and cliff habitats. Some of the specimens in Gibraltar develop impressive trunks, particularly those on or near cliffs. Other trees are less common but frequently encountered. Specimens of the Carob Tree *Ceratonia siliqua* are dotted throughout the scrub, while the Nettle Tree *Celtis australis* does better along the lower reaches of the Rock.

Smaller areas of the Upper Rock consist of lower, more open, garrigue vegetation, which is rich in flowering plants. The garrigue is most widespread at the southern end of the Rock, including a large expanse at Windmill Hill Flats, where it forms a mosaic with more open habitat and patches of thicker maquis. Some areas of garrigue close to cliffs are dominated by the shrubby Warty Spurge *Euphorbia squamigera* and these vegetation formations are of note because they are a listed habitat type under the EU Habitats Directive.

The sandy slopes that comprise the Great Gibraltar Sand Dune dominate the lower reaches of the eastern side of the Rock. On the sandier portions the habitat is that of a

typical coastal dune with plants such as Gibraltar Restharrow *Ononis natrix* (subsp. *ramosissima* var. *ramosissima*), Silver Sea Stock *Malcolmia littorea*, Sea Daffodil *Pancratium maritimum*, Brown Bluebell *Dipcadi serotinum*, Narrow-leaved *Euphorbia terracina* and Southern Spurge *E. baetica*, and the umbellifer *Cachrys libanotis*. Those areas of the slope to the south and north, more dominated by talus, have a more mixed but still identifiably littoral flora.

Perhaps the most important habitat in Gibraltar is its sheer limestone cliffs, which extend from sea level to the Rock's highest peak. These are home to various nesting birds, and most of Gibraltar's special plants – including Gibraltar Candytuft *Iberis gibraltarica*, Gibraltar Chickweed *Cerastium gibraltaricum*, Gibraltar Saxifrage *Saxifraga globulifera* and Gibraltar Sea Lavender *Limonium emarginatum* – all of them primarily cliff dwellers.

Gibraltar's coastal habitats consist mainly of beaches and rocky shoreline and are of limited value to birds. Rocky coasts hold important populations of some marine species, most notably the Mediterranean

Ribbed Limpet *Patella ferruginea*, which is Endangered. The waters around the Rock periodically teem with fish and this can attract the spectacle of thousands of foraging seabirds, when Northern Gannets *Morus bassanus*, shearwaters, terns and gulls vie for prey. There are also a number of sea caves on the east side of the Rock, formed by wave action, some of which have important nesting birds, in particular those in the 'Gorham's Cave complex'. The site is also extremely significant archaeologically and is a candidate UNESCO World Heritage Site, with important fossil remains and deposits ranging from the Neanderthal period to the Carthaginians.

The avifauna

Some 309 species of birds have been recorded on or from the Rock since 1950. Its undoubted importance for migrating birds has been studied by a small but dedicated group of resident ornithologists and regular visitors. Because of its steep and abrupt topography, Gibraltar lacks wetland habitats completely; the only natural bodies of fresh water occur in the karstic cave systems.



Nicholas Ferrary

68. The Rock of Gibraltar has a unique microclimate, owing to its position at the meeting point of a sea and an ocean. The humidity that blows against the Rock's eastern cliffs condenses to form a cloud, even during the summer months. This famed meteorological phenomenon is known as the Levanter, seen here in late June 2015.



69. The Barbary Partridge *Alectoris barbara* is native to North Africa. It was introduced to Gibraltar several centuries ago and is now the Rock's national bird. The species is found nowhere else in mainland Europe and is one of the trigger species for the Rock of Gibraltar IBA (where this bird was photographed in November 2014).

Wildfowl are rarely observed, and Common Scoter *Melanitta nigra* is the most frequently recorded species during seawatches. Some waders turn up along Gibraltar's coastline and as migrants off Europa Point, but they are probably most regular where the runway of Gibraltar's airport meets the sea, and consequently inaccessible to most birders.

Breeding birds

Gibraltar has a small assemblage of breeding bird species, but some of these are of interest. The most notable species is the Barbary Partridge and Gibraltar is the only place in mainland Europe where it occurs. It was introduced to the Rock from its native North Africa, possibly by the British during the eighteenth century; found throughout the vegetated parts of the Rock, it prefers more open habitats.

Gibraltar has lost all of its larger breeding raptors (a pair of Bonelli's Eagles *Aquila fasciata*, a pair of Ospreys *Pandion haliaetus* and two pairs of Egyptian Vultures *Neophron percnopterus* bred on the cliffs until the early twentieth century) but still has falcons. Between five and seven pairs of Peregrine Falcons *Falco peregrinus* of the race *F. p. brookei* breed annually on the cliffs that

surround the Rock, which is a relatively high density. Common Kestrels *F. tinnunculus* began to breed in 1987 and numbers have fluctuated between six and ten pairs recently. Unfortunately, the population of Lesser Kestrels *F. naumanni* is declining. Some 40 pairs bred on the north face of the Rock in 1935 (Rait-Kerr 1935), but this had decreased to 15 pairs by 1980 (Cortés *et al.* 1980) and the number currently fluctuates between four and 17 pairs (Bensusan & Cortés 2007). This decline appears to stem from the increasing distance between breeding site and foraging grounds, due to the growth of the

neighbouring town of La Linea de la Concepción in Spain (Bensusan & Cortés 2007) – and a similar explanation may account for declines in other parts of the range in the Mediterranean (Liven-Schulman *et al.* 2004). A number of pairs of Little Owls *Athene noctua* breed around the Rock and a pair of Eagle Owls *Bubo bubo* recently recolonised after an absence of over 100 years (Garcia 2006). Tawny Owls *Strix aluco* are encountered regularly, but breeding has not been proven.

The most common species in the scrub habitats are Sardinian Warbler *Sylvia melanocephala*, Blackcap *S. atricapilla*, Blackbird *Turdus merula* and Wren *Troglodytes troglodytes*. Smaller numbers of Blue Tit *Cyanistes caeruleus*, Great Tit *Parus major* and Greenfinch *Chloris chloris* also occur, but the tall, thick scrub that covers much of the Rock is rather poor in breeding birds. Pairs of Blue Rock Thrush *Monticola solitarius* are common and the song of the males often reverberates along the cliffs. House Sparrows *Passer domesticus* still thrive in urban areas, as do Blackbirds and Spotless Starlings *Sturnus unicolor*. Thousands of pairs of Common Apus *Apus apus* and Pallid Swifts *A. pallidus* breed on buildings; the former seem to show a

preference for older buildings (Finlayson 1991), whereas Pallid Swifts are also widespread along the limestone cliffs, where they are joined by two small colonies of Alpine Swifts *A. melba* (Gibraltar is the type locality for this species). A small colony of House Martins *Delichon urbicum* is located close to the border with Spain, its spread seemingly constrained by the availability of mud for nests (indeed, the colony's continued presence is perhaps due to the erection of artificial nests). Recent additions to Gibraltar's breeding bird assemblage include Spotted Flycatcher *Muscicapa striata* and White Wagtail *Motacilla alba*, while the Collared Dove *Streptopelia decaocto*, which colonised during the 1990s, is now common.

Gibraltar's huge colony of Yellow-legged Gulls *Larus michahellis*, numbering several thousand pairs, is relatively new (the species was not recorded breeding during the late nineteenth century), and has proved to be a great nuisance to migrating raptors, which are mobbed fiercely, as well as humans. Some 4–5 pairs of Shags *Phalacrocorax aristotelis* of the Mediterranean form *P. a. desmarestii* breed on ledges in the sea caves of the Gorham's Cave complex on the east side of the Rock. This is one of the few colonies in

mainland Iberia (de Juana & Garcia 2015); the Shags share these caves with numerous Pallid and a few Alpine Swifts, as well as some European Free-tailed Bats *Tadarida teniotis*.

Migrant soaring birds

Gibraltar is world famous as a migration bottleneck where the spectacle of migration can be observed, especially that of soaring birds (principally raptors and storks). Regular counts have taken place during spring and autumn, particularly the former, and the database of soaring-bird records stretches back to the late 1960s (Bensusan *et al.* 2007). Tens of thousands of birds occur during the northern hemisphere pre- and post-breeding migration periods, but small movements can be observed throughout the year (e.g. Garcia & Bensusan 2006). Inevitably, numbers are significantly higher during autumn, when many juveniles join adult birds crossing the Strait into North Africa.

The most numerous species are Black Kite *Milvus migrans* and Honey-buzzard *Pernis apivorus*. Many tens of thousands cross the Strait and counts of over 20,000 of each in a single season are not unusual. The largest number of Honey-buzzards recorded in a day is 10,492 on 30th August 2008, while the



Paul Acolina

70. The Rock of Gibraltar holds an enormous breeding colony of Yellow-legged Gulls *Larus michahellis*, numbering many thousands of pairs. Their breeding period coincides with the spring or northerly migration, during which the gulls become very aggressive and mob raptors that fly close to the Rock, particularly larger species such as this Short-toed Eagle *Circaetus gallicus* in April 2005.



71. Honey-buzzard *Pernis apivorus* over Gibraltar, May 2005. Soaring birds congregate at the Strait of Gibraltar in their thousands. The Strait is one of the two main migratory bottlenecks in Europe (the other being Falsterbo, Sweden), and the soaring birds species group is a trigger for the Rock of Gibraltar IBA.

Black Kite record is 10,601 in the afternoon of 2nd August 2011. Booted *Aquila pennata* and Short-toed Eagles *Circus aeruginosus* can also be numerous; the record for the latter in a single day is 1,060 on 7th March 2009 (Garcia 2010). The main species are often joined by smaller but still significant numbers of Eurasian Sparrowhawks *Accipiter nisus*, Marsh *Circus aeruginosus* and Montagu's Harriers *C. pygargus*, Ospreys, Egyptian and Griffon Vultures *Gyps fulvus* and Black Storks *Ciconia nigra*. Scarce species include Red Kite *M. milvus*, Hen Harrier *Circus cyaneus*, Eleonora's Falcon *Falco eleonorae*, Merlin *F. columbarius* and Lanner Falcon *F. biarmicus*, the last as a straggler from North Africa. Occasionally, a Eurasian Black Vulture *Aegypius monachus* or Spanish Imperial Eagle *Aquila adalberti* is recorded. Common Buzzards *Buteo buteo* were once more numerous but no more than one or two per season are now recorded, even though the species remains common in Europe (Bensusan *et al.* 2007).

Soaring birds cross the Strait along a fairly broad front. They naturally prefer to make the crossing at the narrowest point, which is close to the Spanish town of T rifa (around 30 km WSW of Gibraltar). Soaring-bird

migration tends to occur over Gibraltar mainly during westerly winds, when birds are pushed towards the Rock. Some species show a very marked preference for the shortest crossing. For example, only a few hundred White Storks *Ciconia ciconia* are recorded from Gibraltar each year, while totals for the Tarifa area exceed 100,000. Booted and Short-toed Eagles also try to avoid crossing from Gibraltar during autumn and numbers are small in westerly winds. Yet with the increase of humidity and cloud during warm days with easterly winds, visibility is reduced and

when the southern shore of the Strait is not visible, huge concentrations of soaring birds begin to congregate on the northern side. After a few days, thousands of birds may wheel along the shore from west to east and back, searching for a point at which to cross. At such times, many hundreds of Booted Eagles may be seen wheeling over Gibraltar, usually in the company of Short-toed Eagles, Eurasian Sparrowhawks, Black Kites, Honey-buzzards and Egyptian Vultures.

Migrant passerines and near passerines

These can be divided into two groups: trans-Saharan migrants and pre-Saharan migrants, which winter around the Mediterranean Basin. Trans-Saharan migrants tend to arrive later in spring (March to May) and leave earlier in autumn (August to early October), whereas most pre-Saharan species have passed through by late March and do not return until mid October to November. Common trans-Saharan migrants, which include a mix of northern European and Mediterranean species, include Woodchat Shrike *Lanius senator*, Western Bonelli's Warbler *Phylloscopus bonelli*, Iberian Chiffchaff *P. ibericus*, Willow *P. trochilus* and

Garden Warbler *Sylvia borin*, Common Whitethroat *S. communis*, Subalpine *S. cantillans*, Melodious *Hippolais polyglotta* and Reed Warblers *Acrocephalus scirpaceus*, Spotted Flycatcher, Common Nightingale *Luscinia megarhynchos*, Pied Flycatcher *Ficedula hypoleuca*, Whinchat *Saxicola rubetra*, Northern *Oenanthe oenanthe* and Black-eared Wheatears *O. hispanica*, Yellow Wagtail *Motacilla flava* and Tree Pipit *Anthus trivialis*. Less common but still frequent migrants include Golden Oriole *Oriolus oriolus*, Western Orphean *Sylvia hortensis* and Spectacled Warblers *S. conspicillata*, Tawny Pipit *A. campestris* and Ortolan Bunting *Emberiza hortulana*, among a wide range of scarcer migratory passerines.

When it comes to numbers, the autumn passage of pre-Saharan migrants is particularly impressive. Hundreds, or sometimes thousands of Black Redstarts *Phoenicurus ochruros* will descend on the Rock during fall conditions. Indeed, the central European subspecies *P. o. gibraltariensis* was described from the Rock, which is hardly surprising given the abundance with which it occurs. Blackcaps and Robins *Erithacus rubecula* are also abundant during this period, and large movements of migratory thrushes can occur: Song Thrushes *Turdus philomelos* are common, with smaller numbers of Ring Ouzels *T. torquatus* and Redwings *T. iliacus*. Large numbers of Common Chiffchaffs *Phylloscopus collybita* begin to arrive from the middle of October.

The abundant fruit produced by the shrubs on the Rock provides an important food source for pre-Saharan migrants during autumn and winter. These shrubs remain in fruit during part of the winter, when Blackcaps, Robins and Black Redstarts remain abundant and Common Chiffchaffs are numerous, often found feeding on the nectar of Candelabra Aloes *Aloe arborescens*, an introduced succulent from southern Africa that flowers mainly during December. Thrushes, chiefly Song Thrushes, remain in smaller numbers while fruits are available. Perhaps the most exciting wintering species is the Alpine Accentor *Prunella collaris*, which occurs in very small numbers and only in some years, perhaps reflecting conditions in the surrounding mountains in southern

Spain and northern Morocco.

Some passerine species migrate by day, notably hirundines and finches. All five European hirundines migrate past Gibraltar, although the Crag Martin *Ptyonoprogne rupestris* also winters. Finches can be quite plentiful, especially in autumn, with Common Chaffinch *Fringilla coelebs*, Greenfinch, Linnet *Linaria cannabina*, Goldfinch *Carduelis carduelis* and European Serin *Serinus serinus* all numerous. Diurnal movements of pipits and wagtails are also evident.

Of the near-passerines, Eurasian Scops Owl *Otus scops*, European Caprimulgus *europaeus* and Red-necked Nightjars *C. ruficollis* are regular nocturnal migrants. Hoopoes *Upupa epops* are common on passage, especially during March, Wrynecks *Jynx torquilla* are less common but still frequent and European Bee-eaters *Merops apiaster* are conspicuous and numerous diurnal migrants. Passage of the last species tends to coincide with that of soaring birds; if conditions are right, several thousand can be recorded in a day, especially during the southerly migration. The resident Peregrines often take the migrating bee-eaters and swifts which pass through in huge numbers during late July and early August, the latter sometimes attracting the attention of roving Eleonora's Falcons.

Migrant seabirds

Gibraltar is also an excellent place for seabird migration as birds enter and leave the Mediterranean. Europa Point, the Rock's southernmost tip, has a bird observatory perched upon a sea cliff that offers splendid views across the eastern Strait. Moreover, seabird movements are evident throughout the year. Balearic Shearwaters *Puffinus mauritanicus* can be common, with afternoon counts sometimes reaching three figures, while Cory's Shearwaters *Calonectris borealis*, which breed in the westernmost Mediterranean, occur regularly: thousands are often seen off Europa Point in late September and early October where they compete for flying fish with gulls and dolphins. Scopoli's Shearwaters *C. diomedea* can also be numerous on passage to and from their Mediterranean breeding grounds.

Gull migration can be impressive.



72. Third-winter Audouin's Gull *Larus audouinii*, July 2006. This species breeds only in the Mediterranean and passes through the Strait of Gibraltar in considerable numbers. It is one of the trigger species for the Strait of Gibraltar IBA.

Mediterranean Gulls *Larus melanocephalus* are seasonally common, as are Audouin's Gulls *L. audouinii* in late July and August with counts of over 1,500 in an afternoon. Black-headed Gulls *Chroicocephalus ridibundus* and Lesser Black-backed Gulls *L. fuscus* have decreased recently but are still frequent. Migrant terns occur during both passage periods but, like gulls, are particularly conspicuous during late summer, especially September. Black *Chlidonias niger*, Sandwich *Sterna sandvicensis* and Common *S. hirundo* may all be numerous on passage, but Little *Sternula albifrons*, Gull-billed *Gelochelidon nilotica* and Caspian Terns *Hydroprogne caspia* are more scarce. Lesser Crested Terns *S. bengalensis* appear occasionally, especially during October, while Sandwich Terns remain in Gibraltar waters throughout the winter.

Arctic *Stercorarius parasiticus* and Great Skuas *S. skua* can be fairly common during migration (the latter also occur in winter) and Pomarine Skuas *S. pomarinus* are scarce but still regular. Northern Gannets occur throughout the year, but are most common on passage and in winter. A few Razorbills *Alca torda* winter in Gibraltar waters but numbers of these and Puffins *Fratercula*

arctica can be substantial during late winter and early spring, when they leave the Mediterranean en route to their breeding grounds.

Rarities

Rare soaring birds are recorded with some frequency. There have been a few records of Lesser Spotted Eagles *Aquila pomarina* and Pallid Harriers *Circus macrourus*, particularly recently. Long-legged Buzzards *Buteo rufinus* of the North African subspecies *B. r. cirtensis* have become increasingly regular along the northern shore of the

Strait in recent years (Elorriaga & Muñoz 2010, 2013), including Gibraltar, as have Rüppell's Vultures *Gyps rueppellii* (although still just one record for Gibraltar). The most recent addition to Gibraltar's bird list, subject to acceptance by the Gibraltar Rarities Panel, is the Steppe Eagle *A. nipalensis*.

Vagrant gulls have included Grey-headed *Chroicocephalus cirrocephalus*, Laughing *Larus atricilla* and Ring-billed *L. delawarensis*; there are a few records of Macaronesian Shearwater *Puffinus baroli* and Great Shearwater *P. gravis* is also extremely rare; but perhaps the most unusual vagrant seabird was a Cape Petrel *Daption capense* seen off Europa Point in 1979.

Rarer passerines occur from time to time, either in the field or trapped at the ringing station. These have included Little *Emberiza pusilla* and Pine Buntings *E. leucocephalos*, Common Rosefinch *Erythrura erythrura*, Pallas's Leaf *Phylloscopus proregulus* and Yellow-browed Warbler *P. inornatus*. The last species has turned up occasionally during the autumn, although six were ringed during October 2014 alone following an influx to the region, and one wintered in 2012. There are also occasional records of Trumpeter Finch *Bucanetes githagineus*, perhaps of birds

moving between Morocco and southeast Spain. Nearctic passerines are extremely rare but have included Dark-eyed Junco *Junco hyemalis*, White-throated Sparrow *Zonotrichia albicollis*, Indigo Bunting *Passerina cyanea* and Bobolink *Dolichonyx oryzivorus*; reports of Tropical Mockingbird *Mimus gilvus* and Great-tailed Grackle *Quiscalus mexicanus* are likely to have involved ship-assisted birds.

Other important fauna and flora

After the Rock itself, Gibraltar is undoubtedly best known for its thriving population of Barbary Macaques *Macaca sylvanus*. This North African species has been established in Gibraltar since at least the 1700s. It was certainly introduced by humans, perhaps by the British shortly after they took the Rock. Gibraltar's terrestrial mammal fauna is small, with Rabbits *Oryctolagus cuniculus* and Greater White-toothed Shrew *Crocidura russula* being the only non-flying terrestrial species. The list of bats is small but growing, due to the efforts of the 'Gib-Bats' group. Notable species include Schreiber's Bat *Miniopterus schreibersii* and Isabelline Serotine *Eptesicus isabellinus*. Marine mammals are common in Gibraltar's waters, especially dolphins, and three species are seen regularly – Short-beaked Common *Delphinus delphis*,

Striped *Stenella coeruleoalba* and Atlantic Bottlenose Dolphin *Tursiops truncatus* – as well as a range of other whales and smaller cetaceans.

Gibraltar has a rich herpetofauna. Six species of snake occur: Southern Smooth *Coronella girondica*, Western False Smooth *Macropododon brevis*, Ladder *Rhinechis scalaris*, Montpellier *Malpolon monspessulanus*, Viperine *Natrix maura* and Horseshoe Whip Snake *Hemorrhois hippocrepis*. The last species is protected under Annex IV of the EU Habitats Directive, but it is by far Gibraltar's most numerous snake, even in urban environments. The lizard and gecko fauna is equally rich: Andalusian Wall Lizard *Podarcis vaucheri*, Algerian Sand Racer *Psammodromus algirus*, Moorish Gecko *Tarentola mauritanica*, Turkish Gecko *Hemidactylus turcicus*, Western Three-toed Skink *Chalcides striatus* and Bedriaga's Skink *C. bedriagai*, the last being listed under Annex IV of the EU Habitats Directive. Both skinks are found mainly on the sandy slopes on the east side of the Rock, where their subterranean habits make them difficult to observe. The Ocellated Lizard *Timon lepidus* was present on the Rock until recently, but it is now thought to be extinct. The most unusual of Gibraltar's reptiles is undoubtedly the Iberian Worm



Nicholas Ferrary

73. What was formerly known as the Cory's Shearwater has recently been split into three species. Two of these occur at Gibraltar: Scopoli's Shearwater *Calonectris diomedea*, which occurs primarily as a migrant, and Cory's Shearwater *C. borealis*, which can frequently be seen feeding in the waters that surround the Rock (here in July 2012).

Lizard *Blanus cinereus*, which looks very much like an earthworm, lives in the soil and is completely blind. In the sea, three sea turtle species have been recorded, but only the Loggerhead Turtle *Caretta caretta* is regular. The Alboran Sea to the east of Gibraltar is an extremely important foraging habitat for the species.

Butterfly diversity is high and some large and attractive species are resident, such as the Swallowtail *Papilio machaon*, Scarce Swallowtail *Iphiclides podalirius* ssp. *feisthamelii* and Two-tailed Pasha *Charaxes jasius*, while the Monarch *Danaus plexippus* is a relatively recent colonist of gardens. Visible migration of butterflies, particularly Painted Ladies *Vanessa cardui*, and dragonflies can be impressive. The large and striking Gibraltar Funnelweb Spider *Macrothele calpeiana* is common, in both gardens and natural habitats. This species has a very restricted range and is also protected in Annex IV of the EU Habitats Directive. Some small beetles and other invertebrates are possibly endemic, and some are as yet undescribed. Research into subterranean and cave fauna is shedding further light on this.

Gibraltar is located within the 'Mediterranean Basin' biodiversity hotspot and has a rich flora, with c. 660 species recorded,

including exotics. Its plant species assemblage is notable because it is very different from that of the Spanish hinterland, owing to marked differences in geology, and includes some North African components. The Gibraltar Candytuft is fairly common but grows nowhere else in Europe. It is also found on the Tangier Peninsula in North Africa, where it is rarer than in Gibraltar. The Gibraltar Thyme *Thymus willdenowii* is another predominantly North African species that has its only European station in Gibraltar. The Gibraltar Sea Lavender is endemic to both shores of the Strait of Gibraltar and is common on the Rock, where it dots the outcrops and cliffs of Gibraltar's rocky southern shoreline. Smaller numbers grow away from the sea too, up to c. 200 m above sea level.

Two endemic vascular plants are currently recognised: the Gibraltar Chickweed and Gibraltar Campion *Silene tomentosa*. This latter was thought by some to be extinct until 1994, when the species was relocated (Linares *et al.* 1996). Seeds were collected and propagated at the Gibraltar Botanic Gardens, which now grows many plants every year. Two varieties are also endemic to Gibraltar. The Gibraltar Saxifrage *Saxifraga globulifera* (var. *gibraltarica*) is a mountain species that



Nicholas Ferrary

74. The cliffs that surround the Rock of Gibraltar are probably its most striking and unique habitat. As well as their important flora, the cliffs provide breeding sites for birds including some six pairs of Peregrine Falcons *Falco peregrinus* and numerous territories of the Blue Rock Thrush *Monticola solitarius*, photographed here on Gibraltar in May 2013.

Table 1. IBA trigger species and IBA criteria fulfilled by Gibraltar's terrestrial 'Rock of Gibraltar' IBA.

species	season	population estimate	IBA criteria
Barbary Partridge <i>Alectoris barbara</i>	resident	50–75 breeding pairs	B2
Lesser Kestrel <i>Falco naumanni</i>	breeding	4–10 breeding pairs	A1, C1
Lesser Kestrel <i>Falco naumanni</i>	passage	11–100 individuals	A1, C1
A4iv species group – soaring birds/cranes	passage	250,000 individuals	A4iv, B1iv, C5

Table 2. IBA trigger species and IBA criteria fulfilled by Gibraltar's marine 'Strait of Gibraltar' IBA.

species	season	population estimate	IBA criteria
Cory's/Scopoli's Shearwater <i>Calonectris borealis/diomedea</i>	passage	10,000–100,000 individuals	A4ii, B1ii, C2
Balearic Shearwater <i>Puffinus mauretanicus</i>	passage	1,000–10,000 breeding pairs	A1, A4ii, B1ii, C1, C2
Audouin's Gull <i>Larus audouinii</i>	passage	1,000–10,000 individuals	A1, A4i, B1i, C1, C2
	winter	51–100 individuals	A1, C1
Yellow-legged Gull <i>Larus michahellis</i>	breeding	12,000 breeding pairs	A4i, B1i, C3
	winter	1,000–10,000 individuals	A4i, B1i, C3
Lesser Black-backed Gull <i>Larus fuscus</i>	passage	1,000–10,000 individuals	A4i, B1i, C3
Razorbill <i>Alca torda</i>	passage	1,000–10,000 individuals	A4ii, B1ii, C3
Puffin <i>Fratercula arctica</i>	passage	1,000–10,000 individuals	B1ii, C3
A4iii species group – waterbirds	breeding	20,000–50,000 individuals	A4iii, C4
A4iii species group – seabirds	passage	50,000–100,000 individuals	A4iii, C4

favours north-facing cliffs and walls along the higher reaches of the Rock, whilst the Gibraltar Restharrow *Ononis natrix* (subsp. *ramosissima* var. *ramosissima*) is a coastal dune species that grows on the sand slopes of the east side of the Rock.

Important Bird Areas (IBAs)

Gibraltar has two BirdLife International IBAs: one for terrestrial habitat and another for the marine environment. The terrestrial 'Rock of Gibraltar' IBA comprises the entire territory of Gibraltar. It is recognised as part of a migratory bottleneck for raptors and other soaring birds, with over 250,000 individuals crossing the Strait in a single season. Gibraltar is also an important stopover site for passerines and near-passerines during both migrations. The trigger species and IBA criteria fulfilled for this IBA are summarised in table 1 (for definitions of IBA criteria, see www.birdlife.org/datazone/info/ibacriteria).

Threats to species and/or populations

Threats to wildlife in Gibraltar come mainly from urban development and invasive species. A number of invasive plants have an impact on habitats throughout the Rock (Perez 2006), but their effect on birds is limited. In contrast, feral cats *Felis catus* pose a direct threat to birds and other wildlife in Gibraltar, as they do in so many places. They are a particular danger to the Barbary Partridges, which are most vulnerable and in decline.

Land-use pressures are considerable in Gibraltar. The Rock is densely populated and extensively urbanised along its lower reaches, although Gibraltar's extensive network of nature reserves, which are protected at a local and European level (see below), should militate against too high an impact. Trans-boundary issues are also a concern: Gibraltar is very small and some of its breeding and wintering birds spend part of their time

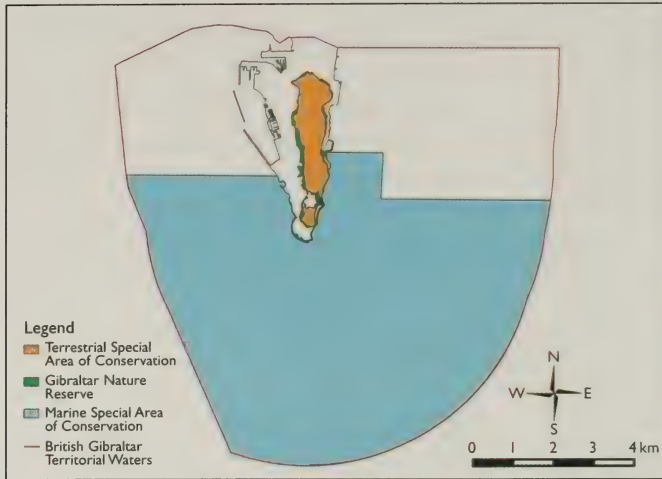


Fig. 2. Gibraltar has a large network of protected areas under both local and EU conservation laws. These cover 36% of the total land area and 63% of Gibraltar's waters. Habitats are protected continuously from the deep sea to the highest peak of the Rock.

foraging in Spain, where habitat loss and other factors are outwith Gibraltar's control (important to, for example, the Rock's Lesser Kestrels).

Conservation measures

Gibraltar's wildlife conservation legislation is governed by its 1991 Nature Protection Act, which affords quite strict protection to most of its wildlife. All birds are protected under the Act and hunting is strictly forbidden. There is no significant illegal hunting or trapping of wild birds and no cases have been reported for many years. This is of major importance because, in the majority of cases, birds occur on passage and hunting is the only factor that could potentially affect them on Gibraltar. Laws pertaining to marine conservation, especially fishing, apply throughout Gibraltar's territorial waters. Some of these, such as a prohibition on fishing with nets, are designed to reduce the impact of these activities on wildlife, including birds as well as fish stocks.

Gibraltar has an extensive network of protected areas. The upper reaches of the Rock (1.45 km², or 22% of the land area) were designated the 'Upper Rock Nature Reserve' in 1993. Gibraltar is part of the European Union, with the UK as its member state, and EU legislation therefore applies to the territory. The 'Rock of Gibraltar' Special

Protection Area (SPA) under the EU Birds Directive and Special Area of Conservation under the EU Habitats Directive were declared in 2011 and 2012 respectively. These are identical in area and incorporated the Upper Rock NR within their boundaries, but were extended to cover some 2 km² to include other habitats of community interest. Consequently the boundary of the nature reserve was redefined in 2013 to include the European protected areas, plus some other sensitive habitats. The reserve was renamed the 'Gibraltar

Nature Reserve' and now includes habitats extending from rocky shoreline to the highest peak of the Rock. The new reserve boundary now encompasses some 2.3 km², meaning that more than a third (36%) of Gibraltar's land area receives legal protection as a nature reserve. In addition, the 'Southern Waters of Gibraltar' were declared both an SPA and an SAC in 2011. This comprises 54.9 km², or 63% of Gibraltar's territorial waters (fig. 2).

The boundary of the Gibraltar Nature Reserve includes the caves where Shags breed, and the 'Southern Waters of Gibraltar' SAC includes the waters around and to the south of the caves, although the birds frequently forage outside the protected site. Access to these caves requires passage through a high-security MOD site and this, coupled with the site's unique archaeological importance, means that access is carefully restricted.

Tired and injured birds of prey are regularly recovered, especially during the spring migration period, which coincides with the breeding season of Yellow-legged Gulls and Peregrine Falcons, which mob and attack them. The GONHS Raptor Rescue Unit runs a recovery and rehabilitation centre for birds.

Recently, the Government of Gibraltar and the GONHS have undertaken a Barbary Partridge repopulation programme, using birds imported from Morocco. This has met



Julien Martinez

75. Gibraltar is famed for its population of Barbary Macaques *Macaca sylvanus*, introduced from North Africa probably by the British. Although they are provisioned with food, the macaques are wild and roam freely, even into urban areas where there are inevitable conflicts with humans. The macaques are strictly protected by law.

with success; the number of sightings has increased dramatically and the partridges have bred during the same year that they were released. The conservation of the Lesser Kestrel is far more complicated. The Raptor Rescue Unit has bred Lesser Kestrels and successfully released the young, using adult birds that have been recovered injured and could not be released. However, due to the problems relating to distance from feeding sites, it is unlikely that much can be done by Gibraltar to conserve the breeding population of this beautiful falcon.

Visiting Gibraltar Birding sites

Migrating birds can be observed from many parts of Gibraltar, but there are nonetheless hotspots and these differ depending on the target species or groups (fig. 1, p. 143). Migration of soaring birds in spring is best watched from Jews' Gate (1) (where the GONHS has an observatory); and in autumn from the top of the Rock, where the best place to watch from is at or around the top station of the cable car that takes visitors from the town up to the crest of the Rock (2). Seabirds can be watched from Europa Point

(3). Windmill Hill Flats (4) is without doubt the best site at which to find grounded passerine migrants, although the site has no public access since it is an MOD training ground. The North Front Cemetery (5) has always been a good place to watch migrant songbirds, especially in spring. Although the habitat has deteriorated recently, good numbers of Woodchat Shrikes and other species can still be expected during fall conditions. Migrant songbirds can be expected in any vegetated areas, including the Upper Rock (6).

The cliffs are the best place for Peregrines and Blue Rock Thrushes, and the Lesser Kestrel colony is restricted to the northern face of the Rock (7), where breeding takes place in spring. A small colony of Alpine Swifts breeds nearby and another lies within the Gorham's Cave complex (8), where Shags also breed. Barbary Partridges are widespread in vegetated areas, but can be difficult to observe. Chance encounters are most likely on the Upper Rock, but the talus slopes on the northern (9) and southern end (10) of the Great Sand Dune offer reasonable opportunities of sightings for observers with patience.

Travel and contributing records

Gibraltar has its own airport but only flights from UK airports (Gatwick, Heathrow, Manchester, Birmingham and Bristol) are permitted to land. It is also possible to enter Gibraltar from southern Spain, but the traffic queues can be unpredictable and the delays extremely long, so walking in is recommended. Most of the main birding sites are accessible by public transport, or are only a short walk away from the nearest bus or taxi stop. Many cruise ships visit and it is possible to do some birding while on a cruise, but the brevity of the stops and the wind-dependent nature of the raptor migration especially make birding opportunities unpredictable.

The database of bird records for Gibraltar extends back to the 1960s and is kept by the Strait of Gibraltar Bird Observatory (SGBO). This is the ornithological section of GONHS, which is a full Partner of BirdLife International. The Society comprises a group of natural historians and scientists with a diversity of interests; it is extremely active in conservation issues throughout Gibraltar, and publishes the biannual *Gibraltar Nature News* magazine and an annual *Gibraltar Bird Report*, which summarises all bird observations on the Rock over the past year. Visitors can submit their records from the territory by e-mail to cperez@gonhs.org or kbensusan@gonhs.org. The GONHS is a small organisation and joining is encouraged as a means of supporting its work. Details can be found on its website: www.gonhs.org.

The SGBO runs a bird-ringing programme based at the Jews' Gate Observatory. This has been in operation continuously since 1992, and provides basic accommodation for visiting ringers. Ringing takes place during the two migration periods, chiefly February to May and September to November, and relies heavily on volunteers

who visit from outside the territory. Anyone interested in participating should contact Charles Perez (cperez@gonhs.org) or Jill Yeoman (jill@gonhs.org).

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Moult and ageing of Isabelline Shrikes

Yosef Kiat and Yoav Perlman



Richard Allen

Abstract The extent, duration and timing of post-juvenile, post-breeding and pre-breeding moults of two members of the Isabelline Shrike *Lanius isabellinus* complex – ‘Daurian Shrike’ *L. i. isabellinus* and ‘Turkestan Shrike’ *L. i. phoenicuroides* – are discussed. Using data from museum specimens and field photographs, significant differences were found in the timing and extent of the first pre-breeding moult. In both forms, pre-breeding moult occurs earlier in adults than in juveniles, while Daurian moults earlier and more rapidly than Turkestan. These differences are related to migration strategy – chiefly timing, distance travelled and conditions on the wintering grounds.

Introduction

Replacing feathers during moult is an energy-intensive process and for most bird species moult does not coincide with other demanding parts of the annual cycle, particularly breeding and migration but also overwintering in higher latitudes. In temperate and northern regions, the parts of the year available for moult are as follows: after breeding and before winter or autumn migration; between winter and start of breeding season; and, for long-distance migrants only, during the midwinter period.

In general, the timing of moult is more variable than that of breeding or migration (Newton 2009), while the time constraints imposed by breeding, migration and the cold season affect moult duration. For example, a complete moult in northern latitudes is typically shorter than in a comparable species in tropical wintering grounds (de la Hera *et al.* 2011), while moult duration of non-migrant, tropical species is on average longer than in Palearctic species (Fogden 1972). Understanding the relationship between moult cycles and migration can be important for

the field identification of similar species, since the effect of moult on a bird's appearance can be significant.

Two forms of the Isabelline Shrike *Lanius isabellinus* occur as vagrants in many European countries (BWP; van der Laan 2008). Nominate *L. i. isabellinus* (hereafter *isabellinus* or 'Daurian Shrike') breeds in southern Russia, Mongolia and China, while *L. i. phoenicuroides* (hereafter *phoenicuroides* or 'Turkestan Shrike') breeds in Central Asia including Iran, Turkmenistan, Afghanistan, Uzbekistan, Tadjikistan and Kazakhstan. Both races are regular migrants through the Middle East, en route to wintering areas in Africa and the Arabian Peninsula (BWP; Worfolk 2000). Two other members of the Isabelline Shrike complex, *L. i. arenarius* and *L. i. tsaidamensis*, breed mainly in China and Mongolia and winter in Pakistan and northern India, and have not yet been recorded in the Western Palearctic or East Africa. These taxa, which are not considered further in this paper, are relatively short-distance migrants and most probably undergo a complete moult on the breeding grounds

before migration (Worfolk 2000).

The identification of Isabelline Shrike has been discussed widely (e.g. Worfolk 2000, van Duivendijk 2011) and the identification of most adults is relatively straightforward. Adult male *phoenicuroides* has a striking head pattern with a rich, rufous crown, prominent whitish supercilium and throat, solid black lores and bill, and blackish wings contrasting with a greyish or grey-brown mantle and dark rufous tail. Adult male *isabellinus* is more obviously creamy-buff on the throat and supercilium and often has buff-toned flanks. Both the upperparts and the tail are warmer-toned. Adult female *phoenicuroides* shows similar plumage tones to those of the male, with dark brown or blackish remiges and wing-coverts, rather whitish (not rich buff) underparts and supercilium, and upperparts varying from dark greyish-brown to a considerably paler sandy grey. Adult female *isabellinus* resembles the male in having sandy grey-brown upperparts and warm buff underparts, giving a relatively uniform appearance quite different from that of *phoenicuroides*. Their



Jeremy Babbington

76. Male 'Turkestan Shrike' *Lanius isabellinus phoenicuroides* after complete pre-breeding moult, Sabkhat Al Fasl, Saudi Arabia, May 2015. Since about half of all second-calendar-year *phoenicuroides* undergo a complete pre-breeding moult, the age of spring birds such as this cannot be determined. Males show a striking head pattern with a rich, rufous crown, prominent whitish supercilium and throat, solid black lores and bill. The underparts are whitish (not rich buff), and the blackish wings contrast with a greyish or grey-brown mantle and dark rufous tail.

head pattern is similar to that of males but less contrasting.

The identification of juveniles is more challenging, but should be possible for most individuals seen well. In general, plumage tones echo those of adults. Juvenile *phoenicuroides* have cold-toned upperparts, earth-brown to pale sandy grey, contrasting with predominantly whitish underparts; and they are usually darker overall than *isabellinus*. The latter is normally paler, more warm-toned and shows less contrast between the upperparts and the sandy-buff underparts.

The moult sequence of Daurian and Turkestan Shrikes has been patchily described in the literature, and there are some contradictions and inconsistencies between the accounts, which this paper seeks to address. For example, Stresemann (1972) summarised the moult strategy of the *isabellinus* group, noting that both *isabellinus* and *phoenicuroides* moult partially in the breeding area and complete that moult on the wintering grounds, in 'late October at the earliest' for *isabellinus* and 'not before November' for *phoenicuroides*. Yet Svensson (1992) noted that *isabellinus* wintering in Asia undergoes a complete moult after breeding and before migration; and that

phoenicuroides undergoes a complete winter moult, although some first-years show an extensive partial moult (rather than a complete moult) in their first pre-breeding moult.

In this paper we describe the moult strategy of Daurian and Turkestan Shrikes, based on data from museum skins and field photographs. We describe the extent, duration and timing of moult in relation to migration distance and wintering grounds, and highlight differences between the taxa that may help field identification. We use terminology for plumage and moult that relates to the breeding cycle and to the extent of moult. Following Jenni & Winkler (1994), we term the moult that occurs in the breeding areas, before autumn migration, as 'post-breeding' moult (in adults) or 'post-juvenile' moult (in juveniles). Post-juvenile moult is the first moult after fledging. 'Pre-breeding moult' takes place after arrival on the wintering grounds (and the 'first pre-breeding moult' refers to that of first-year birds). 'Partial moult' includes body feathers, wing-coverts, tertials and rectrices, but not flight feathers; whereas 'extensive partial moult' includes part of plumage (not all), and also flight feathers (Gargallo & Clarabuch 1995).



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77. Adult male 'Daurian Shrike' *Lanius i. isabellinus* after complete post-breeding moult in November 2014, Dhahran Hills, Saudi Arabia. Compared with male *phoenicuroides*, adult male *isabellinus* is more obviously creamy-buff on the throat and supercilium and often has buff-toned flanks. Both the upperparts and the tail are warmer-toned than in *phoenicuroides*.

Methods

Moult data collection

We examined 271 individuals (116 *isabellinus*, 155 *phoenicuroides*), including 242 specimens from the Natural History Museum, Tring, and four specimens from the Steinhardt National Collections of Natural History, Zoological Museum, Tel-Aviv University (birds from western Asia, the Middle East, the Arabian Peninsula, India and East Africa). In addition, details for 25 live birds in Arabia and Israel were used. Individuals that were not safely identified were excluded from the analysis.

The extent of the post-juvenile, post-breeding and winter (pre-breeding) moults were recorded for the lesser, median, greater, carpal and primary coverts, alula, tertials, secondaries, primaries and rectrices. For birds in active wing moult, primary moult was scored using the standard methodology on a scale from 0 to 5 (Ginn & Melville 1983). Most of our sample is based on birds wintering in the Arabian Peninsula and East Africa, which may differ in moult strategy from populations wintering in southern Asia.

Winter distribution

We categorised the wintering range of each individual sampled between December and February as ‘northern’ or ‘southern’. The boundary between northern and southern regions was chosen as 10°N; hence the Arabian Peninsula, the Middle East and Sudan represent the northern region, and East Africa the southern region.

Data analysis

All statistical analyses were carried out in R (version 3.1.2). The mean duration and mean start date of moult were estimated using the

Underhill & Zucchini (1988) model for type 2 data (moult scores for birds in active primary moult, and birds which had not started or finished moult), using R package ‘moult’ (Erni *et al.* 2013).

Results

Post-juvenile moult

We examined 56 juveniles during autumn, after the post-juvenile moult (31 *isabellinus* and 25 *phoenicuroides*). In both races the post-juvenile moult is partial and limited in extent; in 35 individuals (63%) there was no moult in the remiges. There were no significant differences in the extent of post-juvenile moult between *isabellinus* and *phoenicuroides*, and the details are shown in table 1. (For details on the extent of post-juvenile moult in different feather tracts see fig. 1 and table 1.)

Post-breeding moult

We examined 24 adult birds during autumn after the post-breeding moult (five *isabellinus* and 19 *phoenicuroides*). This is mostly a partial moult, involving replacement of wing-coverts, tertials and rectrices. No significant differences were found in the extent of post-breeding moult between adult *isabellinus* and *phoenicuroides*; see table 1. In addition, one individual had replaced the carpal covert, one bird had replaced all three alula feathers, three birds had replaced 1–7 primaries and two had replaced 1–3 innermost secondaries (fig. 2).

First pre-breeding moult

Our data showed that the extent of the first pre-breeding moult in *phoenicuroides* is significantly greater in the primaries, second-

Table 1. Comparison of the extent of post-juvenile and post-breeding moult in first-year and adult Daurian *Lanius i. isabellinus* and Turkestan Shrikes *L. i. phoenicuroides* (data from races combined).

sample size	post-juvenile moult, races combined			post-breeding moult, races combined		
	<i>isabellinus</i> n=31, <i>phoenicuroides</i> n=25			<i>isabellinus</i> n=5, <i>phoenicuroides</i> n=19		
replaced	none	some	all	none	some	all
lesser coverts	83.9%	3.6%	12.5%	41.7%	8.3%	50.0%
median coverts	73.2%	14.3%	12.5%	37.5%	16.7%	45.8%
greater coverts	71.4%	range 0–4, mean 0.6		20.8%	range 0–9, mean 3.5	
tertials	–	–		4.2%	range 0–3, mean 2.7	
rectrices	89.3%	range 0–2, mean 0.1		12.5%	range 0–6, mean 3.9	



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78. First-year Isabelline Shrike *Lanius i. isabellinus/phoenicuroides* after partial post-juvenile moult; Beit-Shean Valley, Israel, September 2014. Apart from three replaced post-juvenile median coverts (which appear solidly dark with a pale fringe), the remainder of the wing is retained juvenile plumage.

aries and primary coverts than that in *isabellinus*.

Of 60 *isabellinus* that had completed the first pre-breeding moult, all but one had replaced all the carpel, lesser, median and greater coverts, and tertials (fig. 1). The one atypical individual had undergone a typical partial moult (replacement of some greater

coverts, tertials and rectrices, but no remiges). The extent of moult by other feather tracts is given in table 2.

Of 26 known-age *phoenicuroides* in active pre-breeding moult in Kenya, 13 were first-year birds. Of those 13 first-years, five birds showed a partial first pre-breeding moult, the remaining eight (62%) a complete first pre-



Yoav Perlman

79. First-year Daurian Shrike *Lanius i. isabellinus* after partial post-juvenile moult, Ashdod, Israel, October 2010. All plumage is juvenile apart from a few lesser coverts and central tail feathers.



Fig. 1. First-year moult cycle: the extent of post-juvenile and pre-breeding moult in Daurian *Lanius i. isabellinus* and Turkestan Shrikes *L. i. phoenicuroides*.

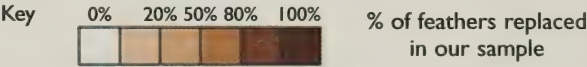


Fig. 2. Adult moult cycle: the extent of post-breeding and pre-breeding moult in Daurian *Lanius i. isabellinus* and Turkestan Shrikes *L. i. phoenicuroides*. There are no apparent differences in the extent of post- and pre-breeding moults between adult Daurian and Turkestan Shrikes.

The block of six boxes under each wing represents tail feathers: from left to right, central to outermost.

Table 2. Comparison of the extent of the first pre-breeding moult in Daurian *Lanius i. isabellinus* (n=60) and Turkestan Shrikes *L. i. phoenicuroides* (n=19, individuals that did not undergo complete first pre-breeding moult). A one-sample t-test was used to test the difference in moult extent between *isabellinus* and *phoenicuroides* within the primary coverts, secondaries and primaries; for all three feather tracts the difference was highly significant between the two races ($P<0.001$).

replaced	<i>isabellinus</i>			<i>phoenicuroides</i>		
	none	some	all	none	some	all
alula	3.3%	5.0%	91.7%	0	0	100%
primary coverts	85.0%	15.0%	0	5.3%	63.2%	31.5%
secondaries	mean 2.1, range 0–6			mean 5.2, range 3–6		
primaries	mean 7.0, range 0–10			mean 9.9, range 7–10		
rectrices	mean 5.9, range 1–6			100% replaced		

Table 3. Moult duration (mean \pm SE) and start date (mean \pm SE) for pre-breeding moult of adult and first-year Daurian *Lanius i. isabellinus* and Turkestan Shrikes *L. i. phoenicuroides*.

	<i>isabellinus</i>		<i>phoenicuroides</i>	
	adult	first-year	adult	first-year
moult duration	49.9 \pm 23.8 days	31.0 \pm 8.4 days	99.5 \pm 12.8 days	66.9 \pm 13.0 days
start date	19 Oct \pm 26.2 days	12 Nov \pm 9.1 days	15 Nov \pm 7.8 days	11 Dec \pm 10.0 days

breeding moult. Of 87 individuals in our sample *after* the pre-breeding moult (in late winter in Africa, or in early spring in Africa or at migration stopover sites), only 19 were first-years showing moult limits (in one or more of three feather tracts: primaries, secondaries and primary coverts). The remaining 68 could not be aged, having undergone a complete pre-breeding moult. Based on the first group (of 26), we assume that around half of the second group (of 87) would be first-years. From these statistics, we

therefore estimate that at least half of all first-year *phoenicuroides* undergo a complete moult in their tropical wintering grounds. The extent of moult for the 19 individuals which showed extensive partial moult is given in table 2.

Adult pre-breeding moult

All adult *isabellinus* and *phoenicuroides* examined had performed a complete pre-breeding moult after arrival on their wintering grounds.



80. First-year male 'Turkestan Shrike' *Lanius isabellinus phoenicuroides* after extensive partial pre-breeding moult; April 1979, Eilat, Israel. The entire plumage was replaced during the pre-breeding moult, apart from a few juvenile primary coverts. The contrast between the old (paler) primary coverts and the darker (outer) new ones is highlighted.

Yosef Kiat



81. First-year male Daurian Shrike *Lanius i. isabellinus* after extensive partial pre-breeding moult; Soreq Valley, Israel, January 2013. Having completed its moult, it still retains all the juvenile primary coverts, plus P7–P10 and S1–S4 (remiges numbered ascendantly).

Pre-breeding moult: start date and duration

We calculated the mean start date and duration for first-year and adult pre-breeding

moult. Both age groups of both taxa undertake the pre-breeding moult immediately after arriving on the wintering grounds, commencing between October and December.

Yosef Kiat



82. Adult male Daurian Shrike *Lanius i. isabellinus* shortly after the complete pre-breeding moult, with the entire plumage fresh; Beit-Shean Valley, Israel, November 2013.



Yosef Kiat

83. Adult female Daurian Shrike *Lanius i. isabellinus*, photographed some time after the complete pre-breeding moult was finished, and thus showing uniform slight wear to the plumage; Beit-Shean Valley, Israel, February 2014. In late winter and spring, adults that moulted early in autumn can show a slightly worn plumage.

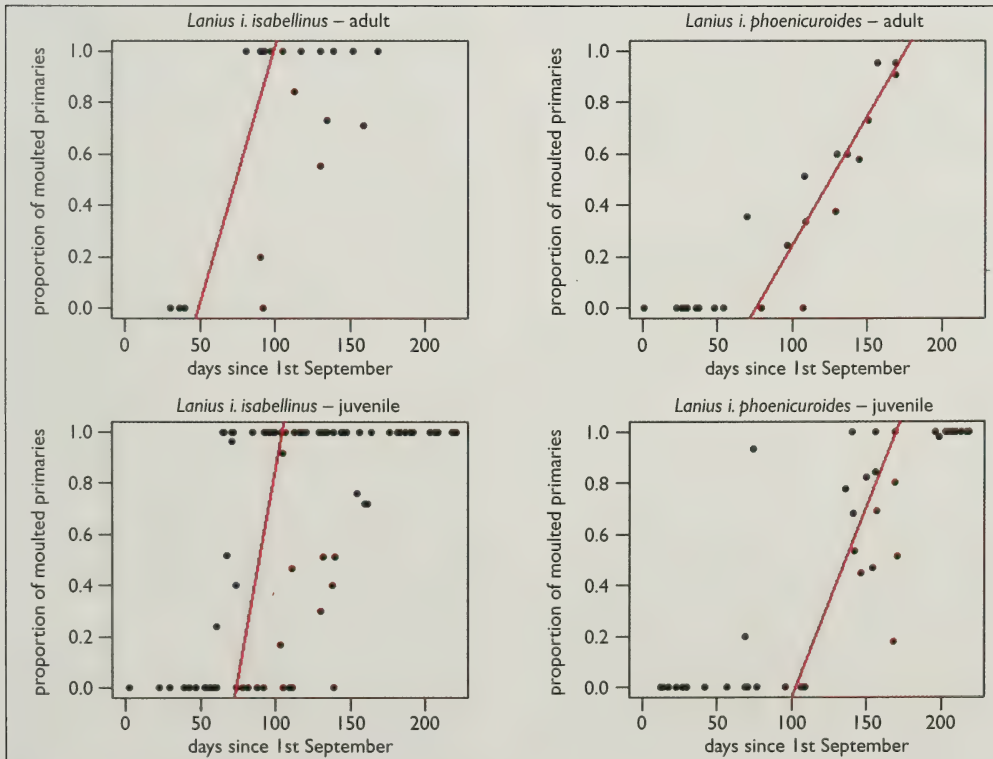


Fig. 3. Start date, duration and extent of moult in adult and first-year Daurian *Lanius i. isabellinus* and Turkestan Shrikes *L. i. phoenicuroides*. Sample size: *isabellinus* $n = 21$ adult, 86 first-year; *phoenicuroides* $n = 32$ adult, 45 first-year.

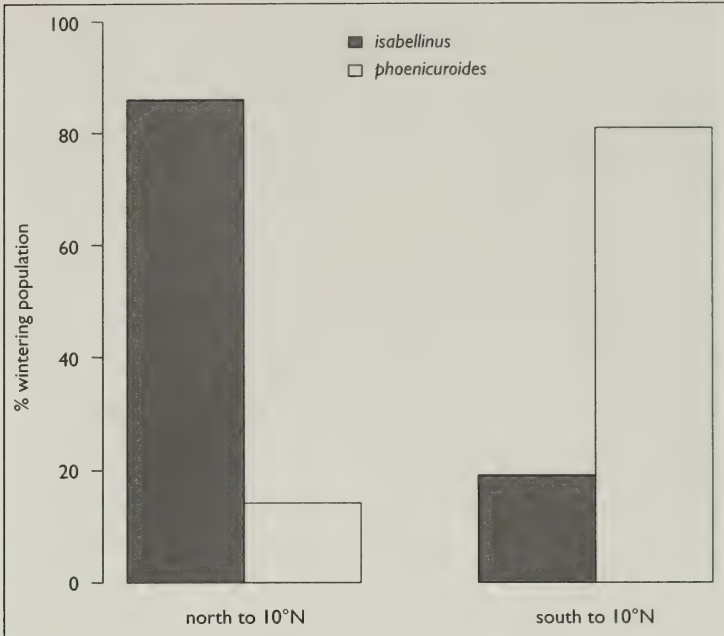


Fig. 4. Segregation between the wintering grounds of Daurian *Lanius i. isabellinus* (n=30) and Turkestan Shrikes *Lanius i. phoenicuroides* (n=30). The differences are significant ($P<0.001$; Fisher's exact test).

The pre-breeding moult of *isabellinus* occurs earlier than that of *phoenicuroides*, and adult pre-breeding moult of both species is earlier than the equivalent first-year moult. In addition, for both taxa, the duration of first pre-breeding moult is shorter than for adult pre-breeding moult (table 3 and fig. 3).

Winter distribution

We examined the distribution of wintering sites for both taxa and found a significant segregation between them. North of 10°N, 86% of 28 wintering shrikes were *isabellinus*, while south of 10°N, 81% of 32 wintering shrikes were found to be *phoenicuroides* (fig. 4).

Discussion

The post-juvenile moult in both Daurian and Turkestan Shrikes is very limited in extent, similar to that of, for example, Red-backed *L. collurio*, Woodchat *L. senator* and Lesser Grey Shrikes *L. minor*, which are also long-distance migrants. This moult occurs immediately after fledging and before the autumn migration, from July to early September (BWP).

In our sample, all adults had completed a partial post-breeding moult, replacing wing-

coverts, tertials and rectrices. As with the post-juvenile moult, this moult occurs on the breeding grounds. This post-breeding moult is more extensive than that of species that winter in southern Africa such as Red-backed and Lesser Grey Shrikes. Worfolk (2000) suggested that some Isabelline and Turkestan Shrikes undergo a complete post-breeding moult but we found no evidence to support this.

The most important differences in the moult strategy of Daurian and

Turkestan Shrikes concern the timing of pre-breeding moult. This moult begins immediately after arrival on the wintering grounds and the differences in timing are probably determined by winter distribution (fig. 4). In essence, Daurian Shrikes winter farther north, they arrive on the wintering grounds earlier and thus start their moult earlier too. Turkestan Shrikes winter farther south, mostly in East Africa, where arrival on the wintering grounds (and correspondingly the start of the moult) is somewhat later (fig. 3).

In both taxa, the adults begin the pre-breeding moult earlier than first-years, on average by 3–4 weeks (table 3, fig. 3), which is simply a function of adults migrating before juveniles and completing their migration more quickly. A similar pattern has been described for Red-backed Shrike, and also for a few other passerines, such as Barn Swallow *Hirundo rustica* and *Acrocephalus* warblers (Kiat 2009).

We suggest that differences in the extent of the first pre-breeding moult between Daurian and Turkestan Shrikes are also due to the differences in their wintering distribution. For example, in the Arabian Peninsula and Sudan, Daurian Shrikes encounter the northern winter. Although they moult soon

after arrival on their wintering grounds, and their pre-breeding moult is a classic 'winter moult', they effectively avoid moulting during the midwinter period; for most birds, the moult is completed by late autumn. First-year Daurian Shrikes, which arrive a little later than adults, shorten the moult duration by retaining some flight feathers and primary coverts. The extent of first-year pre-breeding moult in Daurian Shrike is thus very similar to that in other shrikes wintering at similar latitudes, such as Woodchat and Masked Shrikes *L. nubicus*.

Turkestan Shrikes, which winter mainly in tropical or northern tropical zones, have a longer period with suitable conditions for moulting. So it is perhaps not surprising that the first pre-breeding moult is more extensive than in Daurian Shrike, and that this moult is complete in around half of all individuals. This pattern is probably intermediate between the southern wintering species, Red-backed and Lesser Grey Shrikes, which undertake a complete first pre-breeding moult, and the partial moult of Woodchat, Masked and Daurian Shrikes, which winter farther north. These findings are contrary to some published work on moult – for example, Worfolk (2000) noted that moult of first-year birds in the Isabelline complex is rather similar. Our results also show that both Daurian and Turkestan Shrikes regularly retain some juvenile feathers during their second autumn, after first pre-breeding and post-breeding moults (reported as 'aberrant moult' by Demongin & Yosef 2009).

We found a marked difference in moult duration between Daurian and Turkestan Shrikes (table 1 and fig. 4). To some degree this may reflect differences in the extent of the moult, especially in first years, but may also be a result of differences in moult speed. The adults of both taxa undergo a complete moult, yet that of Daurian is strikingly shorter than that of Turkestan. We suggest that the conditions that limit the extent of first-year pre-breeding moult also limit the time available for pre-breeding moult of adults. The rapid winter moult of Daurian is similar to the rapid post-breeding moult documented for some European migrant passerines, whereas moult duration of Turkestan Shrike is more typical of that of

Palaearctic passerines wintering in the tropical zone (de la Hera *et al.* 2011). The more condensed moult period may result in reduced feather quality (de la Hera *et al.* 2010).

Ageing

Autumn – after the post-juvenile/post-breeding moult

There is no apparent difference in ageing criteria between Daurian and Turkestan Shrikes. Daurian Shrikes start the pre-breeding moult in late autumn (October–December), earlier than Turkestan Shrikes. By late autumn, retained juvenile plumage is fresh or slightly worn and most juveniles of both forms moult only a few lesser or median coverts. At this time, adult females differ from juveniles mainly by their abraded flight feathers and also by differences in the covert pattern (juveniles show pale feather-centres with a dark subterminal line and shaft streak). Most adults will replace some wing-coverts, tertials and tail feathers at this time. Note that during their second autumn migration, some individuals of both forms in their second calendar-year can show three generations of feathers in their plumage.

Spring – after the pre-breeding moult

Adult Daurian Shrikes end their complete pre-breeding moult in November–December, whereas Turkestan Shrikes complete their moult in late winter. First-year Daurian can be aged by a recognisable moult contrast: in most individuals the innermost primaries, outermost secondaries and primary coverts are retained juvenile feathers. These are worn and paler than the new pre-breeding feathers, readily apparent in the hand, and quite easy to distinguish in the field, especially in flight photographs, when the juvenile primary coverts are also a potential ageing cue.

Around half of first-year Turkestan Shrikes undertake a complete pre-breeding moult, after which these individuals cannot be separated from adults. Others retain some juvenile primary coverts, secondaries and rarely a few primaries, and can be aged in spring. With birds in the hand, moult contrast in primary coverts and secondaries is readily apparent, but it is much more difficult to see in the field. Note that our results suggest that the few Daurian Shrikes that

winter in southern regions can show moult patterns closer to Turkestan Shrike than to typical Daurian.

Acknowledgments

We thank Mark Adams and Hein van Grouw from the Natural History Museum at Tring, and Daniel Berkowicz from Steinhardt National Collections of Natural History, Zoological Museum, Tel-Aviv University for granting access to these collections. Thanks also to Jeremy Babbington for moult data of birds in the Arabian Peninsula, and for allowing us to use his images. We are grateful to Ora Schwarz for help with wing illustrations, and to Birgit Erni for help with R package 'moult'.

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Announcements

New county bird recorder

Anglesey David Wright, e-mail Bodafondavid@yahoo.co.uk

BPY 40

Another reminder that the 40th British Birds Bird Photograph of the Year competition is open for entries. Entry is free and the top prize is £1,000. The submission deadline is 1st April, and you can find full details on our website: www.britishtobirds.co.uk/about/bird-photograph-of-the-year

Kittiwakes feeling the heat? Climate, fish and breeding success

Britain and Ireland's breeding seabirds have been a source of considerable conservation concern for a long time. Repeated breeding failures year after year at some colonies, especially in the far north, have hit the headlines repeatedly. But diagnosing the causes of changes in seabird populations is not easy. Typically, seabirds spend only a small proportion of their lives on dry land, when they are relatively easy to study.

The British and Irish Kittiwake *Rissa tridactyla* population has decreased by around 70% since the mid 1980s. This has been linked to large declines in breeding success and adult survival. Previous studies have suggested that these changes are linked to food supply, more specifically sandeels *Ammodytes*. We know that harvesting by sandeel fisheries in the birds' foraging areas can lead to reduced Kittiwake breeding success.

But changing ocean conditions may also be important. Matthew Carroll and his colleagues used data from GPS logger tags fitted to adult Kittiwakes at 11 breeding colonies across Britain and Ireland, to define the area of sea used for foraging at each breeding colony. The researchers compared breeding

success with oceanographic variables, including sea surface temperature and measures of when and how strongly the sea areas 'stratify'. Stratification is a seasonal phenomenon, where cold (often more nutrient-rich) waters are prevented from rising to the surface by layers of warmer water above. This influences the nutrients and light available to phytoplankton, and can affect the timing and abundance of plankton in the spring. This has impacts right up the marine food chain, and can affect the sandeels that the Kittiwakes rely on. If stratification occurs too early or too strongly, sandeels may be smaller or less abundant, or might be available at the wrong time for the birds.

Across all Kittiwake colonies studied, better breeding success was indeed associated with weaker stratification in the period before the breeding season and lower sea surface temperatures during the breeding season. Looking at individual colonies separately, many of those with enough data to examine changes in breeding success over time showed a similar relationship: better breeding success was associated with later stratification, weaker stratification or lower sea surface temperatures.



Guy Anderson

84. Nesting Kittiwakes *Rissa tridactyla*, Filey, Yorkshire, June 2015.

Mathematical models allowed predictions to be made as to what effect predicted climate change might have on Kittiwakes in future. The models predicted possible declines in breeding success by 21% to 43% between 1961–90 and 2070–99. These are sobering figures, but valuable evidence in the continuing efforts to limit the extent and impact of climate change on our wildlife. This also highlights the importance of miti-

gating these predicted climate change effects, for example by protecting sandeel populations from other threats such as overfishing.

Carroll, M. J., Butler, A., Owen, E., Ewing, S. R., Cole, T., Green, J. A., Soanes, L. M., Arnould, J. P. Y., Newton, S. F., Baer, J., Daunt, F., Wanless, S., Newell, M. A., Robertson, G. S., Mavor, R. A., & Bolton, M. 2015. Effects of sea temperature and stratification changes on seabird breeding success. *Climate Research* 66: 75–89.

Food supplies are critical for young Turtle Doves

Studying how successful birds' nesting attempts are is usually relatively easy: nests generally don't move very much. Even measuring adult survival rates can be fairly straightforward, as long as you can assume that marked individuals will return to the same breeding location if they have survived. Studying the bit in between – how many fledged juveniles survive to independence – is much harder: newly fledged birds tend to be secretive, they may not stay in the same place, and often never return to the area where they hatched.

'Post-fledging survival' is frequently a poorly understood component of bird population ecology, and its study often requires specialist and intensive methods. Jenny Dunn and her colleagues tackled this thorny issue for Turtle Doves *Streptopelia turtur* in the UK

by fitting radio tags to chicks in the nest and following these chicks after they fledged. Most stayed close to the nest for three weeks, making foraging trips up to a few hundred metres from the nest site and selecting seed-rich habitats (for example semi-natural grassland, low-intensity grazed land and fallow areas). Crucially, the chicks that were heavier and in better body condition at seven days old had better chances of surviving the first 30 days after fledging.

Previous work on Turtle Doves in the UK has shown the importance of seed-rich habitats for adult doves trying to feed their chicks; how much scarcer these habitats have become in the last 50 years; and the large distances some adult doves travelled to find such food when provisioning chicks. This study adds to this evidence and shows the effect that food availability can have on young birds after fledging. It is yet more good evidence that, as well as worrying about all the possible threats facing this species on its migration routes and wintering area, there is still a strong need to use agri-environment schemes and other conservation measures to improve their lot in their northwest European breeding areas.

Dunn, J. C., Morris, A. J., & Grice, P. V. 2016. Post-fledging habitat selection in a rapidly declining farmland bird, the European Turtle Dove *Streptopelia turtur*. *Bird Conservation International*.



85. Turtle Dove *Streptopelia turtur* chicks close to fledging in Essex, August 2014: their chances will depend on how well fed they were in the nest.

Jenny Dunn

Watching the Directives: what has the EU ever done for bird conservation?

The evaluation of international conservation policy instruments might not seem the most fascinating branch of conservation science, but such studies can have great impact on efforts to protect wild bird populations. A good example of this is a study carried out by Fiona Sanderson and her colleagues at the RSPB Centre for Conservation Science, BirdLife International and the University of Durham who used bird population monitoring data from 1980 to 2012 from countries across Europe to evaluate the effectiveness of the EU Birds Directive.

Adopted unanimously by all existing Member States in 1979, the Birds Directive is the EU's oldest piece of nature legislation. It offers protection to all wild bird species, with an emphasis on species thought to require special conservation measures – known as Annex 1 species. It does this through a system of legal protection from persecution and through a network of protected sites, called Special Protection Areas.

Earlier research (published in the journal *Science* in 2007) showed that, prior to 2000, population trends of species protected under Annex 1 were more positive than those that were not protected; and that, for protected species, trends were more positive after the Directive was implemented than before. The trends of these species were also more positive within the EU than outside it. Much has changed since 2000, however: major ecological changes, including climate change, have affected our wildlife, while 13 new Member States in central and eastern Europe have joined the EU. Fifteen years on, it's time to re-examine the evidence.

Both long-term (1980–2012) and short-term (2001–12) population trends for every breeding bird species in EU countries were examined. Results showed that the factor most consistently related to bird population trend was whether or not the species was listed on Annex 1. Annex 1 species showing population increases in the UK in the long term include Eurasian Bittern *Botaurus stellaris*, Marsh Harrier *Circus aeruginosus*, Avocet *Recurvi-*

rostra avosetta, European Nightjar *Caprimulgus europaeus* and Dartford Warbler *Sylvia undata*. These, and other Annex 1 species, such as Dalmatian Pelican *Pelecanus crispus*, Eurasian Spoonbill *Platalea leucorodia*, Greater Flamingo *Phoenicopterus roseus* and Griffon Vulture *Gyps fulvus*, were more likely to have increasing populations than species not on Annex 1, and this was true for both long- and short-term trends for the original EU15 countries. For the new EU Member States, however, the effect was evident only for short-term trends; given that this group of nations did not join the EU until 2004 at the earliest, this is exactly what would be expected if the trends were driven by such protection. The anticipated impacts of climate change were also detected in the long-term trends, yet the Birds Directive still had a positive impact, even for those species predicted to have suffered under climate change, which in turn suggests that conservation measures implemented under the Birds Directive might help to ameliorate the impact of climate change. The only group of species apparently not benefiting very much from this protection were long-distance migrants, which spend much of their lives outside the EU.

This study showed the continuing effectiveness of the EU Birds Directive in delivering real gains for bird conservation across Europe. This is extremely positive news for international conservation legislation: the results show that it can make a real difference in improving the population trends of targeted species, even against a background of broad-scale threats such as climate change. Conversely, loss or serious weakening of such legislation from the EU as a whole, or indeed from any single country, would be a serious blow for bird conservation.

Sanderson, F. J., Pople, R. G., Ieronymidou, C., Burfield, I. J., Gregory, R. D., Willis, S. G., Howard, C., Stephens, P. A., Beresford, A. E., & Donald, P. F. 2015. Assessing the performance of EU nature legislation in protecting target bird species in an era of climate change. *Conservation Letters* doi: 10.1111/conl.12196

Compiled by Guy Anderson and Dale Richards

Short papers

Problems created by the continuing use of lead ammunition in game hunting

Abstract A conference in Oxford in 2014 focused on the continuing use of lead ammunition in game hunting. The evidence presented and subsequent discussion examined various aspects of this issue, including the effects on both humans and wildlife, alternatives to lead, previous and future restrictions on the use of lead ammunition and the problems of awareness among both the hunting community and the wider public. This short paper summarises the debate.

More than 30 years ago, the Royal Commission on Environmental Pollution advised that 'the Government should legislate to ban any further use of lead shot and fishing weights in circumstances where they are irretrievably dispersed in the environment' (RECP 1983). This is the only one of the Commission's major recommendations not yet to have been fully implemented by Government, although lead fishing weights were banned in 1986. Many birds pick up spent lead gunshot from the environment, and subsequently die of lead poisoning. Humans are affected by lead mainly because they consume it in the meat of game that has been shot with lead-based ammunition. People do not normally ingest enough lead to kill them outright (in the way that some birds do), but sub-lethal levels can have serious effects on human health, especially on mental performance. Lead ammunition is still widely used for game hunting in Britain, despite non-

toxic alternatives being available, and despite an ever-accumulating mass of evidence on the adverse effects of ingested lead on human health and wild bird populations. In December 2014, a conference was held in Oxford (the Oxford Lead Symposium) to consider the evidence on both fronts, and bring together different voices in open discussion. At the end of the conference, I summarised the evidence presented and the resulting discussion, on which the following text is based. The material presented and the discussion at the conference was mostly related to the UK, but when added to findings from the rest of the world there is now a huge body of scientific evidence, which is consistent and overwhelming in its message.

Effects on humans

Lead must now be one of the most thoroughly and extensively studied of anthropogenic toxins, and the effects of lead on people have been recognised for centuries (Stroud 2015). It is a non-essential component of the diet that, at very low levels, affects multiple physiological systems, including nervous, renal, cardiovascular, immune and reproductive systems. It also affects the behaviour of animals, and has been implicated in the criminal behaviour of some people. Influential medical publications have listed lead as 'probably carcinogenic'.

Owing to this knowledge, the most important sources in the environment in Britain have already had their lead content significantly reduced or eliminated (for example paints, petrol and lead pipes),



86. X-ray of a Wood Pigeon *Columba palumbus* sold by a game dealer: note the tiny radio-dense lead particles which would go unnoticed by the consumer.

while other remaining uses of lead (such as batteries or lead sheeting) are well controlled. This leaves lead-based ammunition as the remaining greatest source of emissions of lead to the environment that remains largely unregulated. An estimated 5,000 tonnes of lead ammunition are deposited on the UK every year, raising existing environmental levels, especially in areas of concentrated shooting activity (Pain *et al.* 2015).

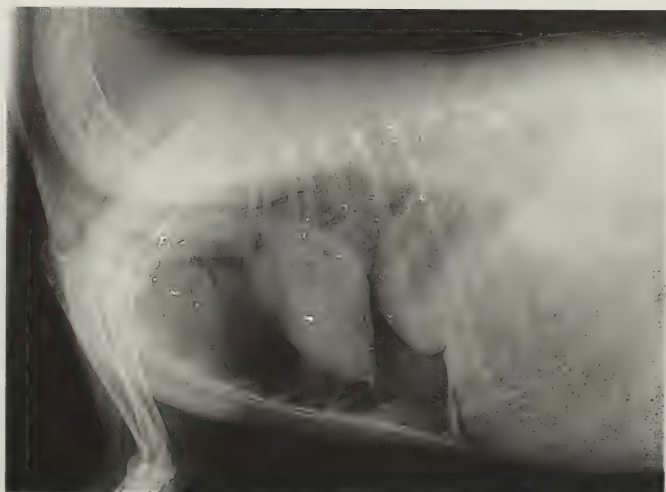
Since additives to petrol were regulated, the main source of lead contamination of people has been via the diet; that derived from lead ammunition is the most readily controllable source. Lead obtained from wild meat, whether in the form of shot pellets or bullet fragments, has been linked with elevated blood levels in people, such blood levels tending to increase linearly with the amounts of game meat consumed. Links between the use of lead ammunition and lead in the human body, and between lead in the body and human health and well-being, are now firmly established by several independent studies (see for example Green & Pain 2015, Knutsen *et al.* 2015).

In recent years, lead has been shown to affect adults and children at far lower concentrations in body tissues than formerly thought, and at lower concentrations than current regulations acknowledge (although acceptable levels have been reduced over the years; Green & Pain 2015). There is no level of lead exposure in children or adults known to be without deleterious effects. In other words, there is no toxicity threshold: the concept of a 'safe level' is redundant. Exposure in childhood to even slightly elevated levels of lead produces measurable and lasting neurological deficits in intelligence and behaviour. Neonates and children with growing brains are especially susceptible.

Relatively new findings concern the behaviour of bullets and shot: the way that lead-based ammunition leaves tiny fragments on

passage through an animal. These can be scattered widely through carcasses, including places distant from the wound tract (plates 86 & 87). This makes it almost impossible for people to avoid ingesting lead along with meat. The bits of lead are so small and scattered that no normal butchery can remove them. So the consumption of meat from animals killed by ammunition containing lead almost inevitably results in the undetected consumption of lead. While this fact may have been known to some for years, new studies have re-emphasised it in a most dramatic way, for example from X-ray images of shot animals (Green & Pain 2015; Gremse & Reiger 2015). Average levels of lead in game meat, measured in recent years, have been several times higher than the suggested maximum permissible concentration in domestic meat (while there are legal thresholds that must not be exceeded for meat from domestic animals, no such thresholds are set for game – even though it can still be sold for human consumption). Some individual meals prepared from gamebirds killed with lead shot have over 100 times the maximum permissible level for domestic meat (Green & Pain 2015).

Since the impacts of lead are largely hidden, typically undetectable without medical study, we can reasonably assume that we have much bigger human health problems caused by lead ammunition than previously



Oliver Krone

87. X-ray of a Roe Deer *Capreolus capreolus* shot with a conventional lead-based (semi-jacketed) bullet; note the extent of fragmentation of the lead projectile and the distance from the wound canal of fragments to which the consumer is then exposed.

recognised. Lead poisoning could potentially affect people anywhere in the UK, if they eat wild waterfowl or game, but particularly those for whom wild game forms a more important part of the diet (such as some of the shooters themselves and their associates). Diabetes, mental and renal problems are some familiar illnesses that are known to be exacerbated by lead. Recent surveys have shown that, among the hunting community alone, up to 12,500 children in the UK are now exposed to dietary, ammunition-derived lead from game meat in sufficiently large amounts to be at risk from some health consequences (as defined by the European Food Safety Authority).

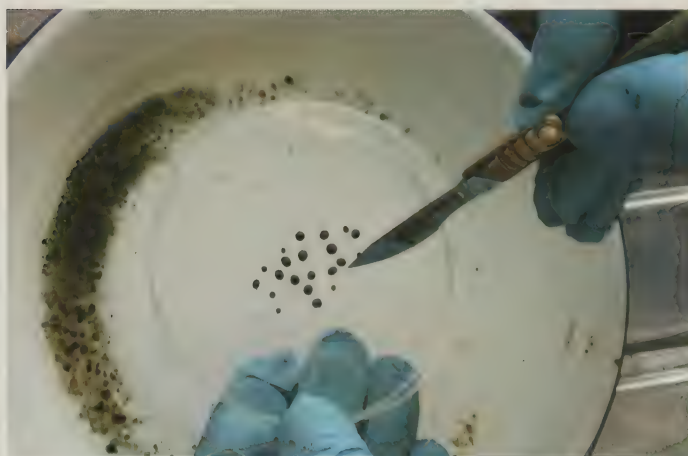
Effects on wildlife

Lead is similarly toxic to a range of other vertebrates, especially mammals and birds. Some species, such as waterfowl, gamebirds and pigeons, ingest spent gunshot incidentally along with the grit needed to assist food breakdown, while meat-eating scavengers ingest lead fragments from the carcasses and discarded gut piles of shot animals on which they feed (a deer shot through the thorax with a lead bullet may have large numbers of lead fragments in the pile of viscera discarded in the field by the hunter; see also plate 88). Worldwide, more than 130 wild bird species are known to have been affected in this way. In some species, thousands or tens of thousands of individuals die from

lead poisoning every year in North America alone. There is no reason to think that the situation is much different in Europe. These incidental casualties include quarry species, which hunters would otherwise seek to preserve. Recent estimates imply that some 30,000–50,000 waterfowl die of ingested lead poisoning in the UK each year (Pain *et al.* 2015). This lead poisoning does not normally produce obvious mass mortalities of the type that can result from disease, because birds die slowly through the year (plate 89), a few at a time, their carcasses swiftly removed by scavengers. Lead-caused mortality is therefore largely hidden.

While this incidental mortality of waterfowl, gamebirds and scavengers may be substantial, we have few assessments of its effects on population levels. For lead poisoning to reduce a population, or cause it to be smaller than it would be in the absence of lead, it has to be additive to other deaths, and not compensated by reduction in other mortality. However, quantitative circumstantial evidence indicating population-level effects is available for some waterfowl (Mateo 2009), and for some scavenging birds of prey, such as eagles and vultures (various papers in Watson *et al.* 2009). Such evidence is available for White-tailed Eagle *Haliaeetus albicilla* in central Europe (plate 90) and Steller's Sea Eagle *H. pelagicus* in Japan (the latter problem having been reduced recently by a legal ban on lead bullets). The evidence on

population effects is particularly striking in the California Condor *Gymnogyps californianus* in North America, which can no longer maintain a self-sustaining population in its historical range: the mortality from ingested lead-based ammunition exceeds its natural reproductive rate. Wherever lead-based bullets of current design are used now in game hunting, it is recognised that the condor is unlikely to survive without intensive remedial intervention anywhere in North



88. Lead gunshot pellets at various stages of erosion removed from the gizzard of a lead-poisoned swan found dead in England 15 years after the introduction of regulations aimed to reduce lead in wetlands.

America. It is being kept from extinction in the wild only by a programme of conservation management involving annual releases of captive-bred birds, coupled with veterinary care, involving frequent capture of wild individuals and treatment to reduce their blood-lead levels (Green *et al.* 2008).

In southern and central Europe, vultures are certainly affected by lead, though population-level effects have not (yet) been documented. And northern Europe has scavenging raptors that are exposed to ammunition-derived lead, but again no research to examine population-level effects has been done. However, Red Kites *Milvus milvus* have been killed by lead ammunition, which could have slowed the rate of recolonisation in the UK (Pain *et al.* 2007).

If lead ammunition was banned, given all the lead already in the environment, how can we be sure that such a ban would reduce the mortality of affected species, and that their populations (if reduced by lead in the first place) would recover? Well, first of all, the uptake of lead by waterfowl and others is much greater in the shooting season than during the rest of the year, which implies that birds are ingesting recently applied lead, rather than older fragments, which presumably eventually sink into the substrate, and thus out of reach. A seasonal cycle in lead uptake is also apparent in raptors and other scavengers that feed on the carcasses of quarry species (Pain *et al.* 2015). Most striking, however, is the

example of the sedentary Mute Swan *Cygnus olor* in Britain. The swans got their lead mainly from fishing weights rather than gunshot, and following a ban in lead fishing weights in 1987, mortality attributable to lead declined from 25% per year in the 1970s to 2% in more recent years, and populations switched from decline to increase. On the most affected river systems,

swan numbers doubled within a decade (Perrins *et al.* 2003). This showed convincingly that, if effective restrictions were imposed, this highly vulnerable species could and did respond by recovery.

Alternatives to lead

Non-toxic alternatives to lead ammunition have been developed, are widely available, and apparently perform well, once the right ammunition has been identified for a particular purpose and gun, and hunters have got used to it (Gremse & Reiger 2015; Kanstrup 2015; Thomas 2015). The argument that lead is best, and that alternatives are less good, is no longer tenable (plate 91). Steel shot is of a similar price to lead shot, but some other alternatives are currently more expensive. Nevertheless, the cost of new ammunition is still trivial compared with the other costs of hunting (Thomas 2015). Lead ammunition was banned totally in Denmark about 18 years ago, apparently without any detrimental effect on the sport (Kanstrup 2015). The same numbers of people are still hunting, and at a similar level. More recently, complete or partial bans are currently in place in at least four other west European countries, with a fifth (Germany) pending. Lead is clearly dispensable as a form of ammunition. In Germany, research on non-toxic bullets has been undertaken to improve their performance, and to smooth the transition from lead (Gremse & Reiger 2015).



89. A lead-poisoned Whooper Swan *Cygnus cygnus* close to death found in Scotland ten years after the introduction of regulations aimed to reduce lead in wetlands. Eroded lead gunshot was subsequently found in the bird's gizzard.

Wildfowl & Wetlands Trust

More research

One standard way to avoid making controversial decisions is to call for more research, from which we can usually benefit. But over the years, evidence on the problems caused by lead ammunition has continued to accumulate, and specific gaps in knowledge have been identified and filled, continually updating our information base. Recent information has served mainly to confirm what we already know, and that the problems persist, but it has added further worrying facts. The essential messages have not changed. Clearly, we already have sufficient, scientifically robust information to take action against the use of lead-based ammunition for sport hunting; and frankly, it would be irresponsible not to do so.

Previous restrictions on the use of lead ammunition

Previous legislation in England in 1999, concerning the use of lead over wetlands and for wildfowl shooting, has been lamentably ineffective, because of a lack of compliance and enforcement. People evidently feel that they will not be caught, and the statistics on prosecutions confirm this. There has been no decline in lead poisoning in waterfowl examined in Britain from before and after this ban (Newth *et al.* 2012). Among ducks intended for human consumption purchased in Britain in 2008–10, at least 70% had been shot with lead ammunition (Cromie *et al.*

2015). A laudable campaign, led by hunting organisations to encourage compliance, did not change this.

Future restrictions on the use of lead ammunition

There are two approaches towards getting hunters to switch from lead to less toxic alternatives. One is by persuasion – informing them of the facts and hoping they will make the switch themselves. This approach has clearly not worked, as shown by the continued use of lead shot over wetlands for more than a decade after the 1999 ban, and the continuing opposition by some hunters and their organisations to restrictions in the use of lead. This leaves us with the only other approach, which is mandatory. All other major uses of lead have long been banned or strictly regulated by law, yet this particular use, which now provides a direct and important route for lead into the human bloodstream, remains unrestricted. Legislation proved necessary in Denmark to cut the use of lead; as in Britain, the dissemination of scientifically collected findings and appeals to the better nature of hunters had not worked.

The problem of awareness

The questions that remain are not so much to do with the effects of lead, on which the scientific evidence is overwhelming, widespread and unequivocal. Rather they concern the attitudes of many hunters and their rep-

representatives. Given all the information that now exists on the impacts of lead on human health and well-being, on its effects on wild birds, and given that satisfactory alternatives to lead are now available, it seems incomprehensible that a large sector of the hunting community in Britain and elsewhere remains opposed to the replacement of toxic lead by non-toxic alternatives. Do they



Oliver Krone

90. Moribund White-tailed Eagle *Haliaeetus albicilla* in the final stages of lead poisoning; found because of its satellite transmitter.

simply not know about the evidence, do they not understand the problems, do they not believe the results of robust science replicated in region after region, or have they been continually fed with misleading information? Perhaps they think the problems are not big enough to worry about (the invisible problem syndrome), perhaps they just object to any further regulation or change of any kind, or perhaps they see the banning of lead as a step on the way to banning hunting. Yet it is difficult to comprehend how those organisations that represent hunters and that continue to oppose restrictions on lead justify to their own members the stance they have taken, given the knowledge we now have. These organisations should be taking a lead in educating their members, and supporting a legal ban in the use of all lead ammunition, yet they are not doing so. Given this intransigence, is it time to put these issues more forcefully before the general public?

Whatever the answers to these various questions, there is clearly a communication problem. No-one has suggested that decisions on such important issues as lead poisoning should be left to hunters alone. If hunters wanted to put only themselves at risk, without affecting other people, domestic livestock or wildlife, it is their choice. But their behaviour *does* affect other people (including their families and associates), domestic animals and wildlife. There are issues of health, well-being and mortality, and also of animal welfare. In Britain, hundreds of thousands of wild bird and mammal carcasses end up each year in the human food chain for consumption by people not involved in hunting. Yet all this meat is distributed to the unsuspecting public without any accompanying health warnings. Campaigns to promote the sale of game meat as healthy omit to mention the lead within. In the presence of the information now readily available (and which has been available for several decades), how can this be allowed to continue? How will the shooting bodies who oppose restrictions on lead justify to their members and the general public the stance they have taken for more than three decades after all other major uses of lead, from paints to petrol to pipes, have been banned or seri-

ously restricted? Europe is moving in the right direction, but far too slowly.

Concluding remarks

My own view is that a legislative ban is needed on the use of lead in all ammunition used for hunting. At a single stroke this would alleviate the problems created for people (especially the hunters themselves), for wildlife and for domestic livestock by this unnecessary but highly toxic material. Of course, a date for the ban would need to be set ahead, to give hunters and manufacturers time (ideally no more than two years) to shift to other materials.

The full proceedings of the Oxford Lead Symposium can be viewed online at www.oxfordleadsymposium.info and can be read in paper form as the reference listed below under Delahay & Spray (2015). In 2010, Defra set up an expert working group (the Lead Ammunition Group) to consider the effects of lead on wildlife and people, and the pros and cons of switching to alternative materials. The report from this group was submitted to Defra in June 2015; it also called for the phasing out of lead ammunition for game hunting. Moreover, the Convention on Migratory Species resolution on poisoning (UNEP-CMS 2014) is also important because it puts our Government under an obligation to do something.

At the time of writing, no response from Government has been forthcoming, but in the meantime, massive opposition to any restriction on the use of lead ammunition has been generated by the shooting fraternity. The subject was also debated briefly in Westminster on 8th December 2015 (a transcript of the debate can be read at www.publications.parliament.uk/pa/cm201516/cmhansrd/cml51208/halltext/151208h0002.htm#15120845000005). This debate was highly revealing. Three MPs (Alex Cunningham, Carolyn Harris and Gerald Jones) showed themselves to be well informed, having read and understood the science; they all argued in favour of a legal ban on lead ammunition. Jones lightened the tone by reminding the House that 'the phrase "crazy as a painter" was coined centuries ago to express the awful effects that lead-packed paint had on people's minds.' In contrast, three other speakers (Geoffrey

A. Johnson



91. Shotgun cartridges: a range of non-toxic alternatives are available. Steel shot represents the most widely used alternative to lead and is comparably priced.

Clifton-Brown, Simon Hart and Rishi Sunak) were essentially dismissive or ignorant of the science, and called for no change in the status quo. They claimed that the evidence against lead was insufficient, 'disputed', 'exaggerated and based on inaccurate data', and 'hotly debated' by 'experts'. A similar line was taken by Jim Shannon MP (a wildfowler from Strangford) who claimed that most of the evidence had 'failed to pass scientific scrutiny', 'the majority of the evidence used to justify increased restrictions or a complete ban on lead shot ammunition is outdated and heavily reliant on research undertaken in other countries', and that 'scaremongering about lead has become a useful way to attack game and sport shooting for people who are fundamentally opposed to shooting in general'.

One of the main arguments from opponents of a ban on lead ammunition is that there is nothing to worry about because lead ammunition has been used for a long time and no-one is recorded as having died prematurely from lead poisoning. I am not sure how anyone could know this, because chemical analyses of body tissues for lead are not normal routine in post-mortem examinations in British hospitals. In any case, the argument for banning lead ammunition has never been based on human mortality rates but on human health issues. It was on this

basis that lead was banned years ago from pipes, paint and petrol; yet, as Gerald Jones said in the parliamentary debate referred to above, 'it still ends up on our plates'. The second argument from opponents to a ban on lead ammunition serves to deflect the debate away from the main issue, claiming that any such ban would represent a major threat to the shooting industry and the rural economy, and even to our GDP. It is not clear how a simple change in the contents of cartridges and bullets could have such dramatic impacts; no-one is being asked to stop shooting but

merely to act responsibly and use non-toxic ammunition.

There is no doubt that the continued use of lead in ammunition is a serious environmental issue. We can look forward – with some concern – to the decision of Government on the future of lead ammunition for use in game hunting.

Acknowledgments

The copyright of the Oxford Lead Symposium is held by the Edward Grey Institute at the University of Oxford, and I am grateful to the director, Prof. Ben Sheldon, for permission to reproduce the section above. The Wildfowl and Wetlands Trust kindly supplied some of the photographs used here. For the remaining images, I thank Dr med. vet. Oliver Krone of Leibniz Institute for Zoo and Wildlife Research, Berlin.

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The *BB/BTO* Best Bird Book of the Year 2015

Abstract *British Birds* and the British Trust for Ornithology announce the winner of the Award for Best Bird Book of the Year. All books reviewed in *BB*, *BTO News* and on the BTO website www.bto.org during the year 2015 were eligible for consideration for this Award.

A total of 74 books fulfilled the criteria for consideration, 18 of which made the extended shortlist for discussion by the judges. As in 2014, the decision was taken to defer consideration of local/regional atlases and avifaunas, the production of which has been inspired by *Bird Atlas 2007–11*. Many have now been published, including some much-admired books, while others are in the pipeline. We plan to consider these by means of a separate award in the 2016 review.

If there is a theme to emerge from this year's top six selections, it is 'conservation' in its broadest sense. There is a celebration of the life of one of nature conservation's most highly respected and talented advocates, a

personal account of a high-profile and contentious conservation issue, and an academic overview of perhaps the most pressing environmental concern of all. Even the two books that focus on a single species have a strong undercurrent of conservation. Only by learning more about birds and their requirements can we hope to conserve them effectively and only if enough people care will the resources be made available to do just that. We would challenge anyone to read this year's winning book and not come away with a greater enthusiasm and determination to help to ensure that its subject, and the habitat on which it depends, is secured for the future.

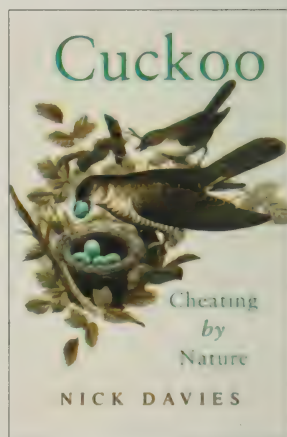
Winner

Cuckoo: cheating by nature

By Nick Davies; Bloomsbury, 2015

Reviewed in BB by Ian Newton (Brit. Birds 108: 357)

This is, in some respects, an unusual book in that it deals with a single species and yet is almost wholly text-based, with no figures or tables to help summarise the information presented. All the more surprising, perhaps, that all six judges had no hesitation in selecting it as this year's winner. The quality of the writing is exceptional and the reader is swept along as the story of this bird's unusual breeding behaviour unfolds, from the earliest pioneering discoveries, through more than 30 years of intensive study, led by the author, at Wicken Fen in Cambridgeshire. The intricacies of the story are explained with a clarity that comes from a sound understanding of the subject, and the author's knowledge and enthusiasm shine through on every page. The text is enlivened by James McCallum's specially commissioned field sketches, completed during three months of the summer spent at Wicken Fen. The book ends on a melancholy note in that only one or two female Cuckoos *Cuculus canorus* have returned to Wicken Fen in recent years, something that even the local Reed Warblers *Acrocephalus scirpaceus* have noticed, adjusting their behaviour accordingly. If you find your appetite whetted and want a more comprehensive and detailed (though equally well-written) overview of the Cuckoo and other nest parasites, then have a look at *Cuckoos, Cowbirds and Other Cheats* by the same author, a book which won this competition as long ago as 2000.





Simon Gillings

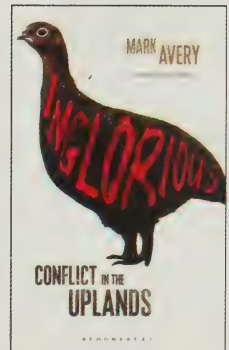
92. Nick Davies receiving the 2015 winner's certificate from Dawn Balmer, February 2016.

2nd *Inglorious: conflict in the uplands*

By Mark Avery; Bloomsbury, 2015

Reviewed in BB by Chris Smout (Brit. Birds 108: 638–639)

Mark Avery's latest book is his third to make the top six in the last four years, which is no mean feat given the number of bird books published these days. This is his highest placing so far and is typically well written and passionately argued. It is also very well structured, guiding the reader on a journey through the background and the main developments in one of the most divisive and contentious bird conservation issues of recent years. It deals with broader issues than the headline-grabbing story of the persecution of Hen Harriers *Circus cyaneus* to reduce predation of Red Grouse *Lagopus lagopus*. And as the story evolves, so the author's attitude hardens, culminating in his proposed solution. Not all will agree with the conclusions but few will fail to be impressed with the lucidity and erudition of the case being made.

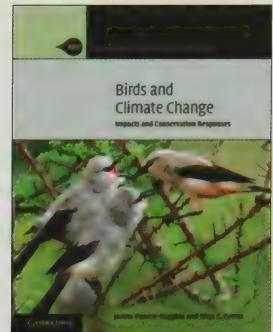


3rd *Birds and Climate Change: impacts and conservation responses*

By James Pearce-Higgins and Rhys Green; Cambridge University Press, 2014

Reviewed in BB by David Parkin (Brit. Birds 108: 179–180)

This is another book focused on a pressing, if broader, conservation issue though, in contrast to *Inglorious*, it is a more academic examination of the subject. It is well written even if, inevitably, given the subject, it is not the lightest of reads. There is a comprehensive assessment of what we know of the impacts of climate change on birds, what might be to come in future and the approaches available to help to mitigate the worst of the effects. This book will probably appeal to a smaller subset of readers than some of the other volumes described here, but it is an important reference and brings together a huge amount of information in one place. It was let down slightly by some errors in the reference list and index, and the high price raised a few eyebrows but, overall, it is highly recommended for those wishing to delve a bit more deeply into this subject.



4th Undiscovered Owls: a Sound Approach guide

By Magnus Robb and the Sound Approach; The Sound Approach, 2015

Reviewed in BB by Martin Collinson (Brit. Birds 108: 495–496)

As noted in the *BB* review ‘the Sound Approach team are not exactly crippled by self-doubt’ and whilst the relaxed and anecdotal style of this book might be seen by some as refreshing, others may be somewhat less appreciative in what is essentially a scientific work. It slots neatly into a series that is quite unlike anything else on offer. This dichotomy was reflected in the views of the judges with four ranking the book highly and two not voting for it at all. All, however, agreed that the book and its accompanying CDs contain a wealth of information and represent a significant advance in our knowledge and understanding of the subject.

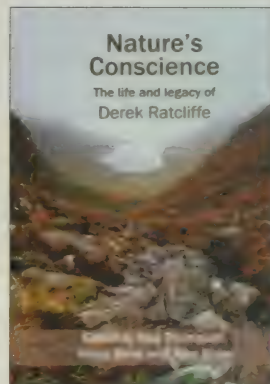


5th Nature's Conscience: the life and legacy of Derek Ratcliffe

Edited by Des Thompson, Hilary Birks and John Birks; Langford Press, 2015

Reviewed in BB by Ian Carter (Brit. Birds 108: 550–551)

This is another highly original book, about an individual who made a hugely significant contribution to nature conservation in Britain over several decades. It may appeal primarily to those who work in the conservation sector, or have a close interest in it, but it contains a diverse range of contributions from many different authors. Almost everyone will find something of interest, even if not everyone will read it from cover to cover. For a large and lavishly illustrated hardback, it represents excellent value for money at £30.

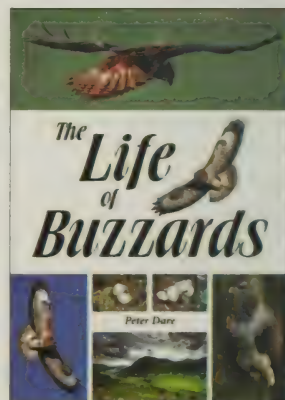


6th= The Life of Buzzards

By Peter Dare; Whittles Publishing, 2015

Reviewed in BB by Rob Bijlsma (Brit. Birds 108: 639–640)

As with the overall winner, this book focuses on a single species, but is more in the mould of a traditional species monograph with numerous tables and figures to help summarise the wealth of information presented. It has been a long time in the making and includes results from studies made by the author spanning six decades and involving several different study areas. It is highly readable and accessible, and generously illustrated throughout with colour photographs. There have been many advances in research techniques since the author started work on his PhD on Dartmoor in 1956 but this book shows that much can still be achieved by direct field observations coupled with hard work and dedication.

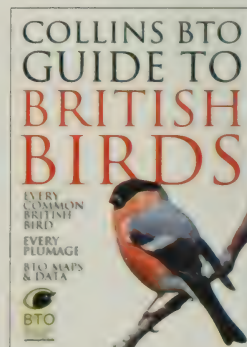


6th= Collins BTO Guide to British Birds

By Paul Sterry and Paul Stancliffe; Collins, 2015

Reviewed in BB by Adrian Pitches (Brit. Birds 108: 553–554)

It is becoming ever more difficult for new field guides to break into a crowded market but this one manages just that. It is based on well-chosen and attractively laid out photographs and a clear, concise text. The novel ‘wagon-wheel’ feature shows the likelihood of encountering each species in any given month, based on data from *BirdTrack*, something that should be especially helpful for beginners, but will also provide plenty of food for thought for the more experienced. The maps, though tiny, make excellent use of data from *Bird Atlas 2007–11*.



Unusually for this competition there were only three additional books that received one or more votes in the final round but did not make it into the top six. In descending order of the number of votes received, they are as follows:

Claxton: field notes from a small planet

(By Mark Cocker; Jonathan Cape, 2014 – see *Brit. Birds* 108: 55–56)

A series of natural history diary pieces centred on the author's village, 'shaped and polished and strung like a set of exquisite bright beads on the line of a year's calendar' according to the *BB* reviewer. We couldn't have put it better!

A Less Green and Pleasant Land: our threatened wildlife

(By Norman Maclean; Cambridge University Press, 2015 – see *Brit. Birds* 108: 756)

A concise and accessible account of the state of our countryside and its wildlife, with the key take-home point neatly encapsulated in the book's title.

The Barnacle Goose

(By Jeffrey Black, Jouke Prop and Kjell Larsson; Poyser, 2014 – see *Brit. Birds* 108: 298–299)

Another high-quality monograph, in the Poyser tradition, and a book that might have finished higher up in the rankings had it included comprehensive coverage of all five of the main populations.

Acknowledgments

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Reviews

Kent Breeding Bird Atlas 2008–13

By Rob Clements, Murray Orchard, Norman McCanch and Stephen Wood

Kent Ornithological Society, 2015

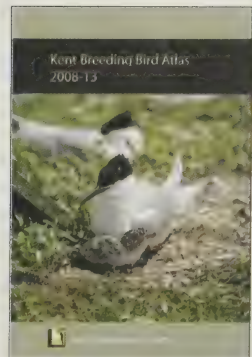
Hbk, 216pp; tables, maps, many colour photographs

ISBN 978-0-9565670-5-5, *BB Bookshop* price £24.49 incl. P&P

Compared with other predominantly lowland counties in Britain, Kent has one of the richest avifaunas, partly because of its position in the far southeast but also because of its wide range of habitats, including open coast, estuaries and woodlands. Yet, as this book clearly shows, the variety and distribution of its breeding birds are not static. This is the third tetrad atlas of the county, each one having been conducted at around the same time as the corresponding national atlas. The current survey took place over a six-year period and the authors have done well to deliver this book within two years of the end of the field-

work. The result is full of concise and useful information, concentrating on the changes over the 40-year period since the first atlas, and is attractively presented.

The book starts with a series of chapters introducing the methodology and how population estimates were derived. There is a fascinating chapter on Kent's changing avifauna, which includes an informative two-page spread using a timeline from 1850 to 2010 to show the species lost or gained in



the county. The first five species to be lost were Montagu's Harrier *Circus pygargus*, Common Guillemot *Uria aalge*, Kentish Plover *Anarhynchus alexandrinus*, Corn Crake *Crex crex* and Cirl Bunting *Emberiza cirlus*, while the five most recent additions were Little Egret *Egretta garzetta*, Honey-buzzard *Pernis apivorus*, Great Black-backed Gull *Larus marinus*, Common Raven *Corvus corax* and Purple Heron *Ardea purpurea*, although Eagle Owl *Bubo bubo* and Egyptian Goose *Alopochen aegyptiaca* may have bred in the last ten years. These and other introduced (non-native) species are portrayed in a different colour in the figure, showing that a high proportion (17%, ten species) of new breeders are in this category. Some species, including Eurasian Sparrowhawk *Accipiter nisus* and Peregrine Falcon *Falco peregrinus*, were lost and later regained, reflecting the impact of the organochlorine pesticides. The chapter on the county's changing avifauna provides more detail and there are other introductory chapters on some sites of conservation importance in Kent, such as the Hoo Peninsula, the Stour valley and Dungeness. Woodland birds in Kent and agricultural land use also receive more detailed coverage.

Also near the beginning of the book, an attractive, 18-page 'photo essay' showcases breeding birds by their status in Kent, under headings of 'new arrivals' (such as Egyptian Goose), 'one-offs?' (e.g. Purple Heron), 'departures' (e.g. Wood Warbler *Phylloscopus sibilatrix*), 'important in Kent' (e.g. Cetti's Warbler *Cettia cetti*), 'future colonisers' (e.g. Great White Egret *Ardea alba*) and 'long shots' (e.g. Penduline Tit *Remiz pendulinus*).

As usual the species accounts form the bulk of the book. First impressions, layouts and especially the maps determine how a book is ultimately received. Turning the pages for the first time is a pleasing experience, with bright maps, clear texts and tables. Every species is illustrated with a colour photograph, all quite small and particularly small when there is more text. My focus was on what the maps and text combined tell me about the birds in Kent. Given the relatively small pages and a format of one species per page, there isn't much room to say much, but the writing is succinct and informative, leaving this reader satisfied with a better understanding of what is and has been happening to the birds of Kent.

The tables show county population estimates (compared with national estimates), conservation status, national trends and the number of occupied tetrads in each of the three Kent atlases. The totals of the number of tetrads recording

confirmed and probable breeding records are combined, which allows comparison with the second Kent (and national) atlas, but I suspect also helps to mask the lower proportion of confirmed breeding records that has been a common problem in recent tetrad atlases.

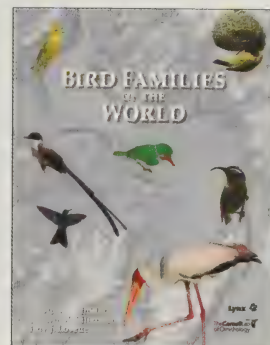
There is just one map per species, which combines current distribution (2008–13) with changes since the previous tetrad atlas (1988–94). This generally works well, and saves a lot of space. Tetrads where a species was recorded in both periods are marked by a dark grey filled circle (against a pale grey background; for some species with a patchy distribution I found these were not always so obvious). Gains are in green, losses in orange (it looks red to me, which must surely cause issues for those with red–green colour blindness; but if you *can* see the colours, the changes are clear). Species showing significant gains are obvious – examples are Marsh Harrier *Circus aeruginosus*, Common Buzzard *Buteo buteo*, Green Woodpecker *Picus viridis* and Cetti's Warbler. The same is true of the species losing ground. I was surprised to see the reduction in occupancy by both Sand *Riparia riparia* and House Martins *Delichon urbicum* (though not by Barn Swallow *Hirundo rustica*). More expected are losses of Northern Lapwings *Vanellus vanellus*, Woodcocks *Scolopax rusticola*, Turtle Doves *Streptopelia turtur*, Willow Warblers *Phylloscopus trochilus* and Corn Buntings *Emberiza calandra*. I was especially shocked by the clear losses of some other species at the tetrad level: Garden Warbler *Sylvia borin*, Tree Sparrow *Passer montanus* and Lesser Redpoll *Acanthis cabaret*. The text explains possible – and plausible – reasons for these changes too. And if the map raises unanswered questions, the book does not shy away from saying so. One thing that would have improved the maps would have been shading for higher ground and lines showing rivers, helping the reader to orientate themselves and relate bird distributions to such features.

There is a lot of information in this book. Although it is compact, it has been tightly edited and the space available on each page is well used. If Kent is your home county or an area you know well, then it is a must-have, while I also commend it to others with an interest in bird distributions and status. There are some important messages included in this book which deserve a wide audience.

Mark Holling

Bird Families of the World: a guide to the spectacular diversity of birds

By David W. Winkler, Shawn M. Billerman and Irby J. Lovette
Lynx Edicions and the Cornell Laboratory of Ornithology, 2015
Hbk, 600pp; many photographs, distribution maps and
illustrations – all in colour
ISBN 978-84-941892-0-3, **BB Bookshop** price £76.99



When I first heard about this book, I assumed that it would be a cut-down version of the family texts from the 17 volumes of *Handbook of the Birds of the World* (HBW). But I was completely wrong: this is a wholly new book, created by a team at the Cornell Laboratory of Ornithology and using an entirely new set of (750) colour photographs. The only parallel with *HBW* is that it includes 2,336 colour illustrations from that publication to depict all of the genera. So it is a brand new book – and to ignore it as just a spin-off from *HBW* would be a mistake.

A 19-page introductory chapter explains how the book works and also introduces the reader to the complexities of taxonomic study. A short paper then highlights three completely new passerine families – Chaetopidae (Drakensberg Rockjumper and Cape Rockjumper), Hylocitridae (Olive-flanked Whistler) and Modulatricidae (Spot-throat, Dapple-chest and Grey-chested Kakamega). None of these are new species – but all have been mixed up in other groups in the past and these new families are described for the first time.

Each of the family chapters gives a general overview of plumage and appearance, habitat preferences, food, breeding and conservation. There is also a section describing the relationships between each family and those that are currently considered to be their closest relatives. The one thing you can be sure of with taxonomy is there is no such thing as ‘the last word’; and the writers are very clear in pointing to where new research is needed. A colour distribution map for each family is included. The *HBW* illustrations of each genus accompany the chapters and the text is liberally scattered with colour photographs. These are generally of a high standard, although a few fall below that standard – such as the one of a Grey Hypocolius *Hypocolius ampelinus* behind a mass of twigs.

Because of the strong cooperation between the teams at Cornell and Lynx, this new book actually confirms the direction in which Volume 2 of the *HBW* Checklist will be heading, in terms of macrosystematics. That book will appear towards

the end of this year and so we can now see that, in total, *HBW* will recognise 36 orders and a total of 243 bird families. The current book makes radical alterations to the layout of the passerines. Many of these changes will be familiar to some, since they have already appeared in other published and online checklists – but with *HBW* currently recognising only 204 families, it is a major step forward.

There are too many changes to describe here in detail but, for example, in *HBW* the Old World warblers (Sylviidae) used to number 272 species in 42 genera, but now they are 65 species in 19 genera. Within these we used to have around 70 warblers of the genus *Phylloscopus* but now we have new families such as the Leaf Warblers (Phylloscopidae), which contains the genus *Phylloscopus* (now reduced to 15 species) and three other genera. So the Wood Warbler is now *Rhadina sibilatrix* and Pallas’s Leaf Warbler is *Abrornis proregulus*. The *Acrocephalus* warblers are now in a group called Reed Warblers and allies (*Acrocephalidae*), which consists of 53 species in six genera.

Another change is the split of Bearded Tit *Panurus biarmicus* into its own family (Panuridae) and away from the parrotbills (*Paradoxornithidae*). Yet those people who rejoiced at the creation of many new species in Volume 1 of the *HBW* Checklist may be in for a disappointment with Volume 2; if the information provided here is correct, there will be 6,037 passerines – making a grand total of just 10,409 species.

Bird Families of the World is a significant book, and one that you will need by your side when working out how all of the new families fit together. Users of *HBW* (and most major checklists other than *Howard and Moore*) will find lots to surprise them in this book. Its style is less conversational than *HBW*, but it provides a lot of information in one place and deserves to be on the bookshelf of every world birder.

Keith Betton

Don't Die in Autumn

By Eric Dempsey

Gill & Macmillan, 2015

Pbk, 286pp

ISBN 978-0-7171-6579-7, £14.99

Eric Dempsey is well known to a generation of British and Irish birders as the voice behind Bird-line Ireland (Birds of Ireland News Service), which he founded in 1990 and ran until its demise in 2009. This book chronicles how a passion for birds shaped his life. He was born in Dublin in 1961 and, as well as providing an interesting and often amusing insight into his strict Catholic school education, the early chapters explore his discovery of natural history and the key influences that shaped his life – chief among them his family. Indeed the title of the book is born from a running joke with his parents – autumn is THE time for rarity-chasing and not the season for the distraction of a family funeral! Major historical events such as the Dublin bombings in 1974 and the Irish Postal Strike in 1979 provide a wider context – the latter was seized upon as a great opportunity for Eric, then a young postal worker, to get some extra time in the field.

The chapters that follow contain much for

birders to identify with: the joy of learning; the angst of being new on the scene; gaining the respect of more estab-

lished birders; the fear associated with identifying and releasing news of a major rarity; the trials and tribulations of twitching; and the addiction that is birding abroad. Foreign travel almost cost the author dear, leading to a serious illness and a severe case of altitude sickness whilst searching for Tibetan Snowcock *Tetraogallus tibetanus*.

This book is well written, entertaining and gives an insight into what makes birders tick. It should also appeal to those who are interested in how, with determination, self-belief and the support of those closest to you, a passion can be turned into a productive and rewarding career.

Paul Harvey



Finding Birds in Hungary

By Dave Gosney, Easybirder.co.uk, 2015. 73-min DVD

BB Bookshop price £18.95, and 36-page booklet, £7.50

The profile of Hungary as a birding destination has perhaps dropped a little since the 1990s, but it still provides great opportunities to see a good range of birds, and with flights from the UK costing as little as £40 each way it is a very affordable destination. Those who make the effort to visit the country are richly rewarded, particularly in spring.

The areas covered in the DVD include the famous plains at Hortobágy in the northeast, and the major woodland areas nearby at Zemplén and Bükk. In particular, there are many fishponds in Hungary and these are visited too, including those at Hortobágy and Polgar, but also Szeged Fegherto, Peteri-to and Csaj-to in the south. Also featured are Kisbálaton and Lake Velence in the southwest, while nearer to Budapest are the Csakvar Marshes and the tiny reserve of Ósca. There is also the Kiskunság National Park, which provides some of the best viewing opportunities for Great Bustards

Otus tarda within relatively easy reach of Budapest.

In total the DVD covers 15 key areas. As always with Gosney's productions, the footage from his high-definition digital video camera is impressive. Apart from Long-eared Owls *Asio otus* and Red-footed Falcons *Falco vespertinus* using neighbouring nestboxes, specialties such as Ferruginous Duck *Aythya nyroca*, Long-legged Buzzard *Buteo rufinus*, Eastern Imperial Eagle *Aquila heliaca*, Ural Owl *Strix uralensis*, European Roller *Coracias garrulus*, White-backed Woodpecker *Dendrocopos leucotos*, Saker Falcon *F. cherrug*, Golden Oriole *Oriolus oriolus* and River Warbler *Locustella fluviatilis* are all featured.

Keith Betton



New Forest Reflections

By Dan and Rosemary Powell

Published privately, 2015

Pbk, 80pp; many colour illustrations

ISBN 978-0-9572301-2-5, £11.00

BB readers will be familiar with the work of Hampshire-based husband-and-wife illustrators Dan and Rosemary, both of whom won the *BB* Bird Illustrator of the Year award back in days of yore. Since their individual triumphs, in 1996 and 2001 respectively, both have regularly provided artwork for *BB*. This little book (it measures 248 × 175 mm) is their 'first solo flight in publishing', and it is a delight. Anyone who knows the New Forest will be transported immediately to the landscapes and the wildlife of Britain's smallest National Park. The book is the product of countless visits to the Forest, and a love affair with the area traced back to childhood holidays.

The book is organised roughly chronologically, from spring through to winter, although while the first entry (in 'early spring', after the introductory pages of preamble) is of an overwintering Great Grey Shrike *Lanius excubitor*, there is very little from the winter months. Around a dozen pages have a single painting but most pages are laid out



with a montage of illustrations. There is a nice mix of the work of both artists, although Dan has contributed the bulk of the landscapes and the birds, while butterflies are Rosemary's speciality and she has done perhaps more of the plants. All aspects of the Forest environment are featured, from pigs to pond skaters, Northern Goshawks *Accipiter gentilis* to Lesser Bladderwort *Utricularia minor*. The accompanying text is fairly sparse but for me, it provides just enough information and context without detracting from the main event, which is the artwork. Priced at £11.00, it really is a steal.

Roger Riddington

Rare Treasures from the Library of the Natural History Museum

Edited by Judith Magee

Natural History Museum, 2015

Pbk, 224pp; many colour illustrations, in box with 36 frameable prints

ISBN 978-0-565-09348-8, *BB* Bookshop price £32.99 incl. P&P

Thirty-one readable essays about individual illustrated books dating back to 1469, although the only ones that are primarily ornithological relate rather predictably to Audubon, Lear, Gould and

Elliot. Good text and beautiful illustrations, but the ground has been fairly well covered before.

Alan Knox

Field Guide to the Bees of Great Britain and Ireland

By Steven Falk, illustrated by Richard Lewington

British Wildlife Field Guides/Bloomsbury, 2015

Pbk, 432pp; many colour illustrations and photographs

ISBN 978-1-910389-03-4-6, *BB* Bookshop price £31.49 quote BB088

A comprehensive guide to the bees of Britain and Ireland. Over a thousand of Richard Lewington's stunning colour and black-and-white artworks, together with more than 700 colour photographs and 234 distribution maps. Detailed texts for all 275 species cover field and microscope characters,

similar species, variation, flight season, habitat, flowers visited, nesting habitat, status and distribution, and parasites.

RR

Recent reports

Compiled by Barry Nightingale and Harry Hussey

This summary of unchecked reports covers early January to early February 2016.

Headlines In a relatively quiet period, the highlights among new arrivals were a Black Scoter off Fife, then Northumberland, and various smaller gulls – both Ross's Gull and Bonaparte's Gull at Hook Head in Co. Wexford, with a Laughing Gull in Cumbria and a Franklin's Gull in Cambridgeshire and Hertfordshire. Otherwise, it was 'as you were', with several long-stayers providing much of the interest, with further small influxes of American Wigeons and Glossy Ibises.

Canada Goose *Branta canadensis* Lissadell (Co. Sligo), race *interior*, long-stayer to 6th February. **Cackling Goose** *Branta hutchinsii* Lissadell, long-stayer to 6th February; Matford Marsh (Devon), 4th–5th February. **Red-breasted Goose** *Branta ruficollis* Foulness area (Essex), 13th January to 7th February.

American Wigeon *Anas americana* Long-stayers Devon, Highland (two), Co. Kerry, Northumberland and Co. Wexford; presumed new arrivals in Fife, Highland, Lancashire & N Merseyside, Outer Hebrides (two), Co. Sligo, Somerset, Co. Waterford, Co. Wexford and Yorkshire. **Ferruginous Duck** *Aythya nyroca* Long-stayers in Co. Durham and Hampshire; new arrivals in Buckinghamshire and Norfolk. **Lesser Scaup** *Aythya affinis* Long-stayers in Cornwall and Shetland, and a returning bird in East Glamorgan. Tullaghnafrankagh Lough (Co. Galway), 24th–25th January; Belfast Lough

(Co. Antrim), 6th–7th February. **King Eider** *Somateria spectabilis* Largo Bay (Fife), long-stayer to 3rd February; Wexford Harbour (Co. Wexford), 14th–24th January; Leverburgh to Berneray ferry (Outer Hebrides), 15th January; Ballyconnell (Co. Sligo), 20th–24th January; Ballisodare Bay (Co. Sligo), two, 23rd–30th January; Skye (Highland), 5th February. **Black Scoter** *Melanitta americana* Rossbeigh (Co. Kerry), long-stayer, 15th January; Kinshaldy (Fife), 15th January; Bamburgh (Northumberland), 27th January to 7th February. **Surf Scoter** *Melanitta perspicillata* Records from Denbighshire, Fife (three or four), Co. Galway, Lothian, Co. Mayo, Orkney, Scilly, Shetland and Yorkshire.

Pacific Diver *Gavia pacifica* Long-stayers Marazion/Newlyn/Perranuthnoe (Cornwall), to 22nd January, again 4th–7th February; Tawin (Co. Galway), to 19th January. **White-billed Diver** *Gavia adamsii* Bluemull Sound, two, 17th January; South Nesting Bay, 17th January; Weisdale Voe (all Shetland), 20th January; South Ronaldsay (Orkney), 16th and 31st January, and 6th February.

Cattle Egret *Bubulcus ibis* Records from Devon, Co. Limerick, Lincolnshire, Norfolk, Somerset (two), Suffolk and Co. Wexford. **Glossy Ibis** *Plegadis falcinellus* Still many birds in Ireland,



93. Adult Glaucous-winged Gull *Larus glaucescens*, Castletownbere, Co. Cork, January 2016.

Steve Gantlett



Larry Dalziel

94. Mourning Dove *Zenaida macroura*, Lerwick, Shetland, January 2016.

including concentrations of 14 at Garryvoe (Co. Cork) on 16th–22nd January, nine at Tramore Backstrand (Co. Waterford) on 12th January and six at Timoleague (Co. Cork) on 23rd–24th January, plus records of one or two in the following additional counties: Antrim, Armagh, Clare, Kerry, Wexford and Wicklow. In Britain, long-stayers in Carmarthenshire, Devon, Somerset, Suffolk and Sussex; presumed new arrivals in Avon, Carmarthenshire (another four), Cornwall, Devon, Essex and Kent.

Northern Harrier *Circus hudsonius* North Ronaldsay (Orkney), long-stayer to 21st January. **Pallid Harrier** *Circus macrourus* Long-stayer Fritcham/Roydon Common (Norfolk), to 7th February.

Hudsonian Whimbrel *Numenius hudsonicus* Marazion/Perranuthnoe, long-stayer to 7th February. **Spotted Sandpiper** *Actitis macularia* Pilmor (Co. Cork), long-stayer to 7th February. **Greater Yellowlegs** *Tringa melanoleuca* Whippingham (Isle of Wight), long-stayer to 7th February. **Lesser Yellowlegs** *Tringa flavipes* Breydon (Norfolk), long-stayer to 28th January. **Long-billed Dowitcher** *Limnodromus scolopaceus* Long-stayers Cresswell Pond/Druridge Pools (Northumberland); to 7th February, and Pennington

Marshes (Hampshire), 12th and 20th January; also Stronsay (Orkney), 24th January; Wanlip Meadows (Leicestershire & Rutland), 6th–7th February.

Brünnich's Guillemot *Uria lomvia* Long-stayer Scapa Bay (Orkney), to 12th January. **Forster's Tern** *Sterna forsteri* Kinvarra (Co. Galway), long-stayer to 2nd February. **Bona-part's Gull** *Chroicocephalus philadelphia* Long-stayers Dawlish Warren/Exe Estuary (Devon), to 7th February, and Wilstone Resr (Hertfordshire), to 17th January, latter roosting at College Lake (Buckinghamshire) to 14th January; also Hook Head (Co. Wexford), 23rd–30th January; Dunnet Bay (Highland), 29th January. **Ross's Gull** *Rhodostethia rosea* Hook Head, 20th January. **Laughing Gull** *Larus atricilla* Walney Island (Cumbria), 30th January. **Franklin's Gull** *Larus pipixcan* Cashen Estuary (Co. Kerry), 24th–28th January; Fen Drayton (Cambridgeshire), 30th January; Amwell (Hertfordshire), 31st January. **American Herring Gull** *Larus smithsonianus* St Just area (Cornwall), long-stayer, 14th and 28th January; Raghly (Co. Sligo), 5th February. **Vega Gull** *Larus smithsonianus vegae* Duncannon (Co. Wexford), long-stayer to 13th January. **Glaucous-winged Gull** *Larus glaucescens* Castletownbere (Co. Cork), long-stayer to 4th February.

John Kemp



95. Gyr Falcon *Falco rusticolus*, South Uist, Outer Hebrides, February 2016.

Mourning Dove *Zenaida macroura* Lerwick (Shetland), long-stayer to 15th January. Snowy Owl *Bubo scandiacus* The Burren (Co. Galway), 27th January. Gyr Falcon *Falco rusticolus* Long-stayer, South Uist (Outer Hebrides), to 6th February (previously on North Uist).

Penduline Tit *Remiz pendulinus* Long-stayers Titchfield Haven (Hampshire), up to four to 20th January, three to 3rd February, and Dungeness (Kent), one to 24th January; also Horsbere Pool (Gloucestershire), two, 11th January to 7th February; Saltholme (Cleveland), two, 5th–7th February. Dusky Warbler *Phylloscopus*

fuscatus Ham Wall (Somerset), long-stayer to 28th January. Rose-coloured Starling *Pastor roseus* Lizard (Cornwall), long-stayer to 31st January; Courtown (Co. Wexford), 31st January. 'Black-bellied Dipper' *Cinclus c. cinclus* Lower Voe (Shetland), 11th January, two 12th–23rd, one to 25th. Arctic Redpoll *Acanthis hornemanni* Birling Carrs (Northumberland), 19th January to 7th February. European Serin *Serinus serinus* Fen Drayton (Cambridgeshire), 4th January, then two, 10th–17th January; Downham Market (Norfolk), 17th–28th January. Little Bunting *Emberiza pusilla* Darts Farm (Devon), 13th–21st January; Tory Island (Co. Donegal), 16th January.

Steve Gantlett



96. Penduline Tits *Remiz pendulinus*, Horsbere Pool, Gloucestershire, January 2016.

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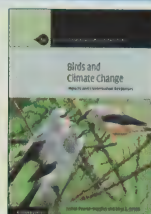
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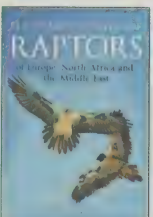
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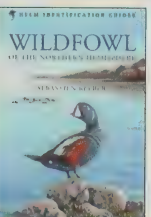
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The outback surrounds of Alice Springs harbour an impressive diversity of wildlife. The town itself, located at the base of the MacDonnell ranges, is the perfect location for a birding adventure,

whether you are doing a day trip or choosing to spend more time exploring the region.

For a birding experience closer to town the Old Telegraph Station Historical Reserve, just 4km north of Alice Springs is a popular spot. This historic site marks the first European settlement in the area, established in 1872 to relay messages between Darwin and Adelaide. Today you might spy a Red-browed Pardalote or, if you're lucky, a Grey Falcon.

The Olive Pink Botanic Gardens makes a perfect spot in town to combine your birding with a hearty lunch. This popular location on the banks of the Todd River protects a profusion of native flora that, in turn, attracts more than 80 bird species. Highlights include the Western Bowerbird – ask at the café about an active bower – and, if you're lucky, the elusive Grey Honeyeater. Each season brings something new: in winter, listen out for Striated Pardalote and Rufous Whistler; in summer, watch for Rainbow Bee-eater and Spiny-Cheeked Honeyeater.



Rainbow Bee-eater



Splendid Fairywren



Orange Chat

After lunch, if you're up for another excursion, you could head south to Simpson's Gap, some 18km West of Alice at the entrance to the West MacDonell National Park. Here, against a spectacular canyon backdrop and amid ancient ghost gum trees, you may find the likes of Splendid Fairy-wrens and Chestnut-rumped Thornbills. The site is steeped in Aboriginal history and mythology, including dreamtime tales of giant goanna ancestors. Walking tracks and cycling trails allow you to explore as far as time allows.

Alternatively, some 7km closer to town and along the same route, you could stop at Alice Springs Desert Park. This environmental education facility features carefully recreated outback habitats – sand country, woodland and desert rivers – where you can enjoy family-friendly exhibits and activities, and stroll in large enclosures to view the outback's native fauna. Unsurprisingly, it is also a hotspot for the local birdlife, including Major Mitchell's cockatoos.

However you spend your afternoon, Anzac Hill makes the perfect place to end it. Alice Springs' most popular landmark, unveiled on 25 April 1934, was originally dedicated to those who died during World War I but now serves as a memorial to all those who have given their lives for Australia's armed forces. History aside, the viewing platform offers a panoramic views across town and a chance to see a spectacular sunset over the beautiful surrounding ranges.

Evening means time to reward your day's exertions by sampling the local cuisine. Alice Springs offers a fine selection of dining establishments, from continental bistros to Asian-inspired eateries. But true carnivores might head to the celebrated Overlanders Steakhouse, where – with kangaroo, crocodile and camel on the menu – you can sink your teeth in, outback-style.



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A day in the Flinders Ranges

Nature and wildlife experiences in South Australia's outback

You glance up as an angular shadow sweeps across the trail. It's a wedge-tailed eagle, that telltale silhouette rising in leisurely spirals on the first thermal of the day. A shrill 'keek-keek-keek' announces a nankeen kestrel, which darts out from the hillside to mob the huge raptor, buzzing around it like a bee. The two birds slip away towards the horizon, as the eagle tries to shake its diminutive tormentor.

This brief birding break allows you time for a drink and a chance to take in the magnificence of your surroundings. The trail winds over the ancient contours of Wilpena Pound, a vast natural amphitheatre composed of ancient sediments that folded and faulted around 540 million years ago. Below you, a maze of dry creek beds winds through a carpet of wild bush that stretches to the walls of the pound. Beyond looms the 1,170-metre summit of St Mary Peak, the highest point in the Flinders Ranges.

You don't have to be a birder or geologist to enjoy the Flinders Ranges. For many visitors, this magical place – located some 420km north of Adelaide – is simply about wilderness and isolation. And there are numerous ways in which to experience its rugged charms, from simply tramping the dusty outback on one of many hiking trails to exploring the scenic terrain by mountain bike, airplane flight or even from the bird's-eye view of a helicopter. And with an excellent range of accommodation, your choice of how to spend a day is bewildering.

After lunch, you head out on a bush road with your guide in search of more wildlife. As you pass through the open woodland, red kangaroos lift their heads from their grazing, a male emu leads his stripy brood into the shade and a 1.5metre-long lace monitor lizard lumbers off the verge.



Rock-wallaby



Short-tailed Grasswren



Nankeen Kestrel

Two decades ago you wouldn't have seen all this wildlife. The Flinders Ranges have since benefitted from a far-sighted conservation programme called Operation Bounceback, which for over 20 years has been working to restore the native ecology and wildlife. Painstaking action, including the removal of feral goats and eradication of feral foxes, has seen impressive results – including the reintroduction of such scarce native species as western quoll, an increase in short-beaked echidnas, and the region's first sightings of little long-tailed dunnart and little forest bat. Birds are doing well too, with at least 34 species of state conservation significance, including Short-tailed Grass Wren and Blue-Winged Parrot.

Among this wildlife bonanza, however, one animal is the undoubted star. In the fading late afternoon light, you raise your binoculars to a movement on a rugged hillside and there it is: a yellow-footed rock-wallaby. This diminutive marsupial, specially adapted to hopping around steep rock faces, was reduced by 1990 to fewer

than 50 individuals. Today the estimated 1,200 that flourish here represent some 70% of Australia's remaining population.

The Flinders Ranges are not only about nature. You end your day at Arkaroo Rock, where the frieze of charcoal and ochre images – mysterious in the late afternoon shadows – offer an insight into the ancient aboriginal culture in which the region is steeped. These paintings are the work of the Adnyamathanha people, and depict the creation story of Wipena Pound, in which the mythological Arkaroo Serpent drank all the waters of Lake Frome – now a seasonal slat pan to the northeast.

Back at your lodge – a charming converted 1850s farmstead – you sit down around an old wool-classing table to enjoy fine local food and an extensive cellar of South Australian wines. And later, as the sunset's embers fade into darkness and the bush noises start up, you retire to a fire pit to listen to outback stories and watch the stars rise over this ancient land.



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